NORTH PACIFIC FISHERY MANAGEMENT COUNCIL
FISHERY MANAGEMENT PLAN FOR GROUNDFISH
OF THE BERING SEA/ALEUTIAN ISLANDS

AMENDMENT 9

NOTICE OF AVAILABILITY

The North Pacific Fishery Management Council has directed the Bering Sea Plan Team to prepare an amendment (No. 9) and supporting documentation for management of the Bering Sea/Aleutian Islands groundfish fisheries. The Council has identified the issues and problems to be addressed by Amendment 9 but has not yet chosen preferred solutions. The Plan Team has reviewed the issues and identified and analyzed the biological, socioeconomic and management impacts of various alternative solutions for public and Council consideration based on all information available to it at this time. These issues and alternative solutions are listed and briefly described below.

A draft Environmental Assessment (EA), and Regulatory Impact Review/Initial Regulatory Flexibility Analysis (RIR/IRFA) have been reviewed by the Council at their March 27-28 meeting and approved for public distribution. These documents are available upon request by calling the Council staff at (907) 274-4563. Primary contact: Jim Glock.

The Council is requesting that anyone having additional information pertaining to these issues or alternatives submit it to the Council during the 30-day public comment period which commences April 4. All new information will be summarized and included as appropriate in the final documents. Due to the time constraints imposed by the annual management cycle and Council meeting schedule, it will not be possible to include information received after the close of the comment period at 5:00 p.m. on May 3.

The Council is also asking for the opinions of the fishing community and other affected individuals regarding which alternatives the Council should approve. It is hoped that the draft EA and RIR/IRFA will help the public provide meaningful and constructive feedback to aide the Council in their deliberations.

At their May 21-24 meeting the Council will make their final decision and submit the amendment and supporting documentation to the Secretary of Commerce for implementation. The Council will accept oral testimony at the May meeting; however, such testimony should be limited to clarification of earlier written comments and recommendations about the Council's choices rather than submission of new information.

AMENDMENT 9 SUMMARY

ISSUES AND ALTERNATIVE MANAGEMENT SOLUTIONS

A. Raise the upper end of the Optimum Yield (OY) range.

Raising the upper end of the OY range would provide greater management flexibility to respond to years of high stock abundance and would allow the annual Total Allowable Catch (TAC) to be increased above the current ceiling.

Alternative 1 - Raise the upper OY from 2.0 million mt to 2.5 million mt.

Since FMP implementation the sum of the EYs has exceeded the ceiling in 1983, 1984, and 1985 and catches have had to be constrained. This situation may reoccur in the future, although current indications are that the overall TAC will probably fall within the current OY range in 1986.

The proposed upper limit is somewhat arbitrary. It is above the Maximum Sustained Yield (MSY) ceiling of 2.4 million mt.

Alternative 2 - Status quo.

The current OY range has constrained total catches in three years; however, the Council could have chosen to constrain these catches anyway. The current ceiling has been within 10% of the sum of the EYs every year.

B. Reduce the incidental catch of salmon in joint venture fisheries.

The first year of significant joint venture pollock harvest north of the Aleutians in INPFC Area I was 1983 when the incidental catch included 24,493 (mostly chum) salmon. The incidental catch in 1984 was 60,436 salmon, again mostly chums. In both years the catch was concentrated in a roughly 2°x5° area during July and August and caught almost entirely with mid-water gear. Joint ventures harvested 55,000 to 96,000 mt of groundfish (pollock) valued at $5 to $9 million in this area during this period. The availability of pollock outside this time/area window is not known, but it is likely that similar concentrations may not be present elsewhere. The likely bycatch rate of salmon outside the time/area window is also unknown.

Western Alaskan and other U.S. chum salmon stocks are already fully utilized in traditional fisheries and any catch of those stocks by joint ventures could reduce traditional catches. It is not known what proportion of the trawl catch is Western Alaskan or from other U.S. areas. However, the FMP states that trawlers must minimize their bycatch of salmon regardless of origin.

Alternative 1 - Close the area from 55°N to 56°30'N between 164°W and 169°W from July 20-August 25.

The majority of the incidental salmon catch was taken in this time-area in 1983 and 1984. The closure could reduce the joint venture groundfish harvest and/or increase the cost of harvesting those groundfish.

Alternative 2 - Close the area from 55°-56°30'N between 164°-169°W from July 20-August 25 when a salmon prohibited species catch limit is reached.

This closure would be implemented only if the salmon bycatch exceeds a certain level. It provides the opportunity to trawlers to modify their fishing gear or techniques to avoid salmon and the subsequent closure. Because the limit might be reached very quickly enforcement may prove difficult. The ceiling could be 10,000 salmon or some other number.

Alternative 3 - Impose incidental catch quotas for individual joint ventures.

A total catch ceiling (see Alternative 2) would be apportioned among individual companies or vessels either equally or in proportion to their projected groundfish catch during the July 1 - August 30 period. Upon reaching their quota the company or vessel must stop fishing in the identified time/area. Transferable quotas could be considered.

Alternative 4 - Impose incidental catch fees.

A catch fee of $.25-$.50 per pound of salmon (the approximate exvessel value to traditional salmon fishermen) or some other fee may be possible. Any fees collected would revert to the general treasury and could not go directly to any of the affected salmon fisheries.

Alternative 5 - Status quo.

Current regulations require trawlers to release all salmon but do not restrict the number of salmon actually caught. Voluntary measures could be recommended under this alternative.

C. Reduce the incidental catch of fully utilized domestic species by foreign trawlers.

The rapid expansion of U.S. fishing and processing capacities has led to full utilization by American fishermen of several groundfish species in Alaskan waters. Measures to reduce or eliminate bycatch of these species in foreign fisheries will allow domestic fishermen to capitalize on the resource more effectively.

Alternative 1 - Close the area within 20 miles of the Aleutians to all foreign trawling.

The Council has already voted an emergency regulation to close this area to foreign trawling to reduce the incidental catch of Pacific cod, Atka mackerel, sablefish, and Pacific ocean perch. If this closure had been in effect in 1983 it would have reduced the foreign bycatch of these species by approximately 88%-92% and the total harvest by 64%.

Alternative 2 - Status quo.

Although no data are available yet for definitive analysis, indications are that most foreign fishing in 1984 occurred outside the proposed 20 mile closure. This was due to the greatly reduced allocations of these fully utilized species.

Alternative 3 - Establish zero TALFFs for all species in the entire Aleutians Area (INPFC Area 4) except pollock.

This alternative would, in effect, expand the 20-mile closure and include all foreign vessels rather than just trawlers. Only directed pollock fisheries in areas of low abundances of other species would be allowed.

D. Require domestic catcher/processors to submit periodic catch reports.

Because U.S. catcher/processors often remain at sea for several months at a time, it is virtually impossible for management agencies to track cumulative catches on a timely basis and to accurately predict the attainment of DAP levels in the fishery.

Alternative 1 - Status quo.

The number of catcher/processor vessels and subsequent catches are expected to increase substantially in 1985. Without timely reporting it is likely that TACs will be exceeded in the future with possible resource damage.

Alternative 2 - Require an FCZ processing permit with check-in/check-out and weekly catch report.

Alternative 3 - Require an FCZ processing permit with a weekly catch report, but without check-in/check-out requirements.

Alternative 4 - Place observers aboard a small sample of catcher/processor and mothership/processor vessels and extrapolate the catch from these vessels to the entire fleet. The cost of NMFS observers is approximately $235 per day. There are other associated costs such as food and transportation in and out of port for transfers, etc.

Alternative 5 - Place observers aboard all catcher/processor and mothership/processor vessels.

E. Implement the NMFS Habitat Policy.

Alternative 1 - Implement the entire proposed text into the FMP.

This action modifies and adds certain sections specifically to address habitat requirements of individual species. It also provides the necessary authorization for implementation of marine debris restrictions and other regulations to protect the marine habitat.

Alternative 2 - Include only a habitat goal into the FMP and reference specific sections and detailed text in a separate Council document. That would speed updating the document since it would not have to go through the tedious amendment process.

Alternative 3 - Status quo. Do not implement the habitat policy.

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ENVIRONMENTAL ASSESSMENT OF AMENDMENT 9 TO THE FISHERY MANAGEMENT PLAN FOR THE GROUNDFISH FISHERY OF THE BERING SEA AND ALEUTIAN ISLANDS AREA

ADOPTED BY
THE NORTH PACIFIC FISHERY MANAGMENT COUNCIL
FOR PUBLIC REVIEW

PREPARED BY THE PLAN TEAM FOR THE
GROUNDFISH FISHERY OF THE BERING SEA AND ALEUTIAN ISLANDS AREA

MARCH 28, 1985

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ENVIRONMENTAL ASSESSMENT OF AMENDMENT 9 TO THE FISHERY MANAGEMENT PLAN FOR THE GROUNDFISH FISHERY OF THE BERING SEA AND ALEUTIAN ISLANDS AREA

I. INTRODUCTION

The domestic and foreign groundfish fishery in the 3-200 mile fishery conservation zone of the eastern Bering Sea is managed under the Fishery Management Plan for the Groundfish Fishery of the Bering Sea and Aleutians Islands Area (FMP). This FMP was developed by the North Pacific Fishery Management Council (Council), approved by the Assistant Administrator for Fisheries, NOAA (Assistant Administrator), and implemented by a final rule on January 1, 1982 (46 FR 63295, December 31, 1981). A final environmental impact statement was prepared for the FMP and is on file with the Environmental Protection Agency. Since that time, the Council has adopted eight amemdments to the FMP. The subject of this action is DRAFT Amendment 9. It contains five proposals, which are described below.

Prior to 1984, the Council would receive amendment proposals during any of its scheduled meetings. At its April, 1984 meeting, the Council adopted a policy whereby proposals for amendments would be received only once a year. Proposals contained in Amendment 9 were requested by the Council in September 1984 with a deadline set at December 7, 1984. The Council then instructed its Plan Team to review and rank each proposal that was received. At its February 1985 meeting, the Council reviewed the recommendations of the Plan Team, Scientific and Statistical Committee, and Advisory Panel, and selected six proposals for inclusion in Amendment 9. Other proposals were identified for development and consideration in a future amendment. At their March meeting they deleted one of the six.

The five topics to be reviewed in this environmental assessment are: (1) increase the upper end of the optimum yield (OY) range to 2.5 million metric tons; (2) Reduce the incidental catch of chum salmon (Onchorhynchus keta) by joint venture trawlers. (3) Establish measures to reduce the incidental bycatch of fully utilized domestic species by foreign trawlers in the Aleutian Islands; (4) establish a reporting system for catcher/processor vessels; and (5) implementation of NMFS habitat policy. Each of these topics will be presented as chapters of this document.

This environmental assessment is prepared under Section 102(2)(C) of the National Environmental Policy Act (NEPA) and its implementing regulations.

II. DESCRIPTION OF AND THE NEED FOR THE MANAGEMENT MEASURES

1. INCREASE THE UPPER END OF THE OPTIMUM YIELD RANGE TO 2.5 MILLION MT

The objective of this proposal is to provide for greater management flexibility necessary to more fully utilize groundfish resources in amounts consistent with increases in biomass surplus production. Amendment 1 to the FMP established a single optimum yield (OY) for the groundfish complex in the Bering Sea/Aleutians equal to a range of 1.4 - 2.0 million mt. The complex has 10 commercial species or species groups of groundfish. The OY is equal to the sum of the Total Allowable Catch (TAC) for each species. Each year the Council determines the TAC for each species using the best available information concerning the acceptable biological catch or equilibrium yield (EY) for each species and also socioeconomic data. The sum of the TACs cannot exceed or be less than the OY without amending the FMP, a process that requires about one year.

The maximum sustainable yield for the groundfish complex is estimated to be 1.7-2.4 million mt. This amount is equal to the sum of the MSYs for the major individual species groups. Ecosystem models, however, indicate that the MSY may exceed 2.4 million mt. These models simulate the dynamics of the principal components of the Bering Sea/Aleutian ecosystem and indicate that the minimum exploitable groundfish biomass may be at least 9.5 million mt. This amount should be capable of sustaining exploition above 25 percent or more than 2.4 million mt.

When Amendment 1 was developed and implemented, the sum of EYs was below the upper end of the OY range. Recruitment of several strong year classes of groundfish have enhanced the condition of several stocks, which have thus increased in biomass. As a result EYs have increased steadily from 1.5 million mt in 1977 to a peak of 2.2 million mt in 1984. The current upper limit on the OY has constrained the Council during some years from setting a total TAC at a level that would allow for fuller utilization of surplus production. This constraint has occurred during the last three years - 1983, 1984, and 1985 when the EY exceeded 2.0 million mt for each year (Table 1). Although the sum of EYs has declined slightly in 1985 and certain other factors indicate that the sum of EYs may decline further in the near future, the sum of EYs is expected to exceed 2.0 million mt in future years as a result of conservation and management measures now made possible under the Magnuson Act. An increase in the upper end of the OY range would provide the Council and the Secretary of Commerce broader latitude to fully utilize the groundfish resources.

Table 1. Estimated MSY and EY (1,000s mt) for the groundfish complex in the Bering Sea/Aleutian Islands Area.

Year	MSY*	EY	OY
1977	1,627-2,251	1,486	1,368
1978	1,627-2,251	1,485	1,486
1979	1,627-2,251	1,571	1,486
1980	1,627-2,251	1,791	1,571
1981	1,630-2,307	1,910	1,579
1982	1,677-2,351	1,928	1,579
1983	1,676-2,223	2,127	1,624
1984	2,086-2,212	2,248	2,000
1985	2,095-2,220	2,188	2,000

* Note: Total annual MSYs fluctuate from year to year within the FMP range of 1.7-2.4 million mt to reflect new information obtained about the conditions of various groundfish species.

2. REDUCE THE INCIDENTAL CATCH OF CHUM SALMON (Onchorhynchus keta) BY JOINT VENTURE TRAWLERS

U.S. joint venture operations, i.e. U.S. fishing vessels delivering their catch to foreign processing vessels, have expanded dramatically in the Bering Sea and Aleutian Islands since their introduction to the area in 1980 (Table 2). The total all species harvest increased by more than ten-fold from 1980 to 1984 and is expected to nearly double again in 1985. The majority of this increase has been in pollock joint ventures in the Bering Sea, which increased from 10,600 mt in 1980 to 149,000 mt in 1983. Preliminary data indicate the harvest reached over 235,000 mt in 1984, and in 1985 it is expected to reach over 390,000 mt.

This rapid development of the U.S. fishing industry, while very profitable to those involved, has led to increased catches of species which are prohibited to both foreign and domestic trawl vessels. The FMP and current groundfish regulations state that "The operator of each vessel shall minimize its catch of prohibited species." All species of salmonids, including chum salmon, are considered prohibited species and must be returned to the sea with a minimum of injury. Foreign nations are given a salmon prohibited species catch (PSC) limit which equals the total salmon PSC multiplied by the ratio of the nation's groundfish allocation divided by the total TALFF plus reserves. Once the nation's PSC limit is reached, the Salmon Savings Area is closed to

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Table 2.--Estimated catches of groundfish (1,100s t) taken by the foreign and joint-venture fisheries in the Bering Sea/Aleutian region 1977-84.[a]

Fisheries/ species group	1977	1978	1979	1980	1981	1982	1983	1984[b]
FOREIGN DIRECTED FISHERY								
TOTAL	1,288.7	1,383.3	1,288.3	1,295.0	1,273.0	1,188.1	1,125.2	1,193.1
Pollock	978.4	977.7	944.0	1,006.1	986.9	959.9	891.5	
Pacific cod	35.9	46.8	41.4	37.3	39.1	28.2	41.5	
Sablefish	4.6	2.0	2.2	2.4	3.0	3.8	3.2	
Atka mackerel	NA	24.2	23.3	20.2	18.0	7.4	1.2	
Rockfish	10.8	7.5	7.2	8.5	7.3	4.9	2.0	
Yellowfin sole	47.3	140.9	101.1	77.8	81.2	76.0	85.9	
Turbots and other flatfishes	89.3	94.9	89.9	88.5	91.9	79.3	80.3	
Pacific herring	19.3	8.4	7.5	0.8	0.3	1.9	1.4	
Other fish	94.7	71.5	64.7	47.0	39.4	22.3	14.3	
Squid	8.4	9.4	7.0	6.4	5.9	5.0	4.0	
JOINT-VENTURE FISHERY								
TOTAL				32.7	78.5	108.6	211.2	361.8
Pollock				10.6	42.1	54.6	149.0	
Pacific cod				8.4	9.2	13.6	14.4	
Sablefish				<0.1	0.2	0.1	0.1	
Atka mackerel				0.3	1.6	12.5	10.5	
Rockfish				0.1	<0.1	<0.1	0.1	
Yellowfin sole				9.6	16.0	17.4	22.5	
Turbots and other flatfishes				2.8	6.0	9.2	11.7	
Pacific herring				0.1	0.0	<0.1	1.1	
Other fish				0.7	3.4	1.1	1.6	
Squid				0.0	<0.1	<0.1	<0.1	

[a] Statistics for 1977-83 from Berger et al, 1984
[b] Preliminary

trawling by that nation for so much of January - March and October - December that remains in the fishing year. Any subsequent salmon catch during the year is deducted from the nation's limit for the next year. An incidental catch reduction schedule has been in effect since 1982, effectively reducing the number of salmon caught each year.

Due to the short time domestic vessels have operated in the Bering Sea/Aleutian Islands management area, no such catch restrictions or penalties have been implemented for U.S. trawl vessels. In 1983 an increase in joint venture agreements between U.S. catcher vessels and Japanese processing vessels led to a nearly tripling of the U.S. pollock catch in the Bering Sea. At the same time, the U.S. catch of salmon increased from 2,382 in 1982 to 24,493 salmon in 1983 (Table 3). In 1984, joint ventures took a total of approximately 60,400 salmon, 99.9% of which were chum (Table 4).

This high salmon bycatch by joint ventures has been concentrated in a relatively short time period and small area. For example, in 1983 high catch rates began on July 31, peaked on August 16 and were over by August 25 (Figure 1). While this figure reflects only hauls where 50 or more salmon were captured, it is indicative of all catches in this time and area. Table 5 shows the monthly summaries of salmon catch and the corresponding groundfish catches in INPFC statistical areas 1,2, and 4. These data are also shown by location in Figure 2. High salmon bycatches occurred between 54°30'N and 56°N and between 164°W and 169°W in 1984.

Foreign trawlers have been generally successful in avoiding concentrations of salmon in recent years, although Japanese surimi trawlers targeting on pollock did encounter numbers of chum salmon. Figure 3 shows their fishing patterns throughout 1983 and the associated salmon bycatch rates. In the third quarter bycatch rates approached 0.5 salmon per metric ton of groundfish in the area of concern. Joint venture bycatch patterns for the same period (Figure 4) are generally similar but significantly higher in two ½° x 1° statistical reporting areas.

The time and location of catch make determination of the origin of these chum salmon very difficult. Although scale samples were taken from many of these salmon, the scales have not been analyzed to determine stock origin. Preliminary indications are that the fish were immature and not destined to spawn until at least the next year. They were not schooled up as part of a spawning run and in fact were caught after spawning chum salmon had entered western Alaska rivers. Present knowledge of chum salmon migration patterns is sketchy although they are known to migrate great distances. Stock separation studies based on scale pattern analysis and high seas tagging indicate that maturing chum salmon caught in June in the same general area are destined to spawn in Bristol Bay rivers, the Yukon River, other western Alaska rivers, Japan and the Soviet Union. Most fish in the area (roughly 80-95%) were Alaskan fish. No information is available on chum salmon in the time and area of concern. However, it is reasonable to assume that a large portion of these are from rivers in Western Alaska and other areas of the U.S. and destined to return to traditional fisheries in terminal areas in subsequent years. Most chum salmon stocks in the Western Alaska region are in relatively healthy condition and the high seas bycatch would not constitute a resource conservation problem. Certain stocks, for example Yukon River fall chums, are far below optimum production levels and some components of that stock are more

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Table 3.--Estimated incidental catches (Nos. and t) of salmon (Oncorhynchus spp.) in the foreign and joint-venture groundfish fishery in the Bering Sea/Aleutian Island region, 1977-84.

Year	Total		Foreign		Joint-venture	
	(Nos.)	(t)	(Nos.)	(t)	(Nos.)	(t)
1977	47,840	198	47,840	198	NF	NF
1978	44,548	137	44,548	137	NF	NF
1979	107,706	340	107,706	340	NF	NF
1980	122,002	388	120,104	381	1,898	7
1981	43,191	140	42,337	137	854	3
1982	23,623	92	21,241	85	2,382	8
1983	42,666	120	18,173	66	24,493	54
1984 (Jan.-Nov.)	73,200		12,800		60,573	

NF = no fishing
More than 97 percent of salmon in joint-venture fisheries were chum salmon in 1983 and 1984.

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Table 4.--Estimated incidental catches (Nos. and t) of chum salmon (Oncorhynchus keta) in the foreign and joint-venture groundfish fishery in the Bering Sea/Aleutian Island regon, 1977-84.

Year	Total			Foreign			Joint-venture		
	(Nos.)	%	(t)	(Nos.)	%	(t)	(Nos.)	%	(t)
1977	4,306	9		4,306	9		NF		
1978	4,811	10.8		4,811	10.8		NF		
1979	6,139	5.7		6,139	5.7		NF		
1980	6,726	5.6		6,726	5.6		0	0	0
1981	6,184	14.32	18.12	5,800	13.7	17.02	384	45.0	1.10
1982	7,697	32.58	25.30	7,116	33.5	23.91	581	24.4	1.39
1983	32,141	75.33	75.14	8,201	45.09	22.47	23,940	97.74	52.67
1984[a]	73,200			12,800			60,400		

[a] Preliminary through November 1984.
NF = no fishing.

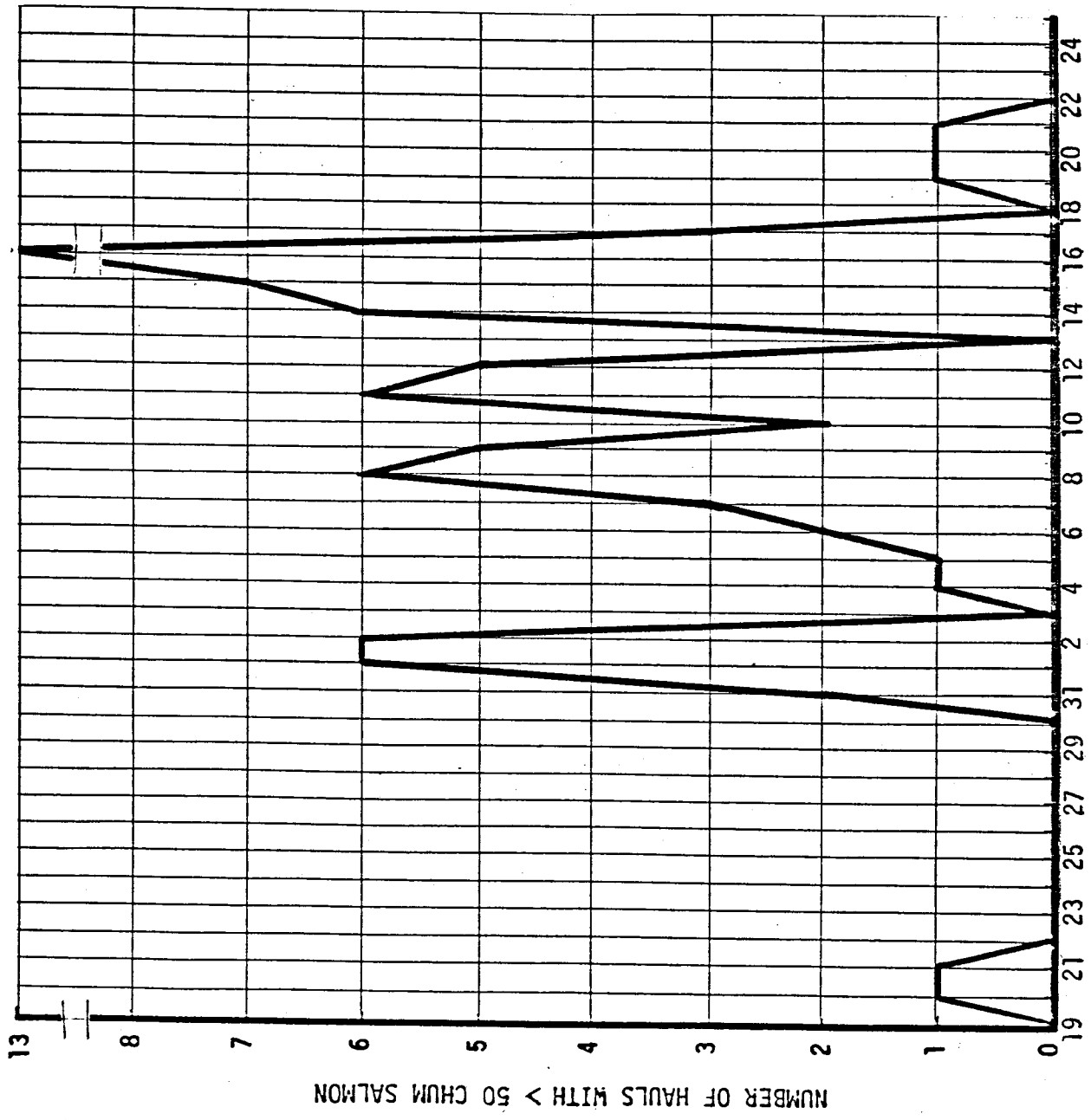


Figure 1 Number of hauls with greater than 50 chum salmon by daily periods, July-August 1984.

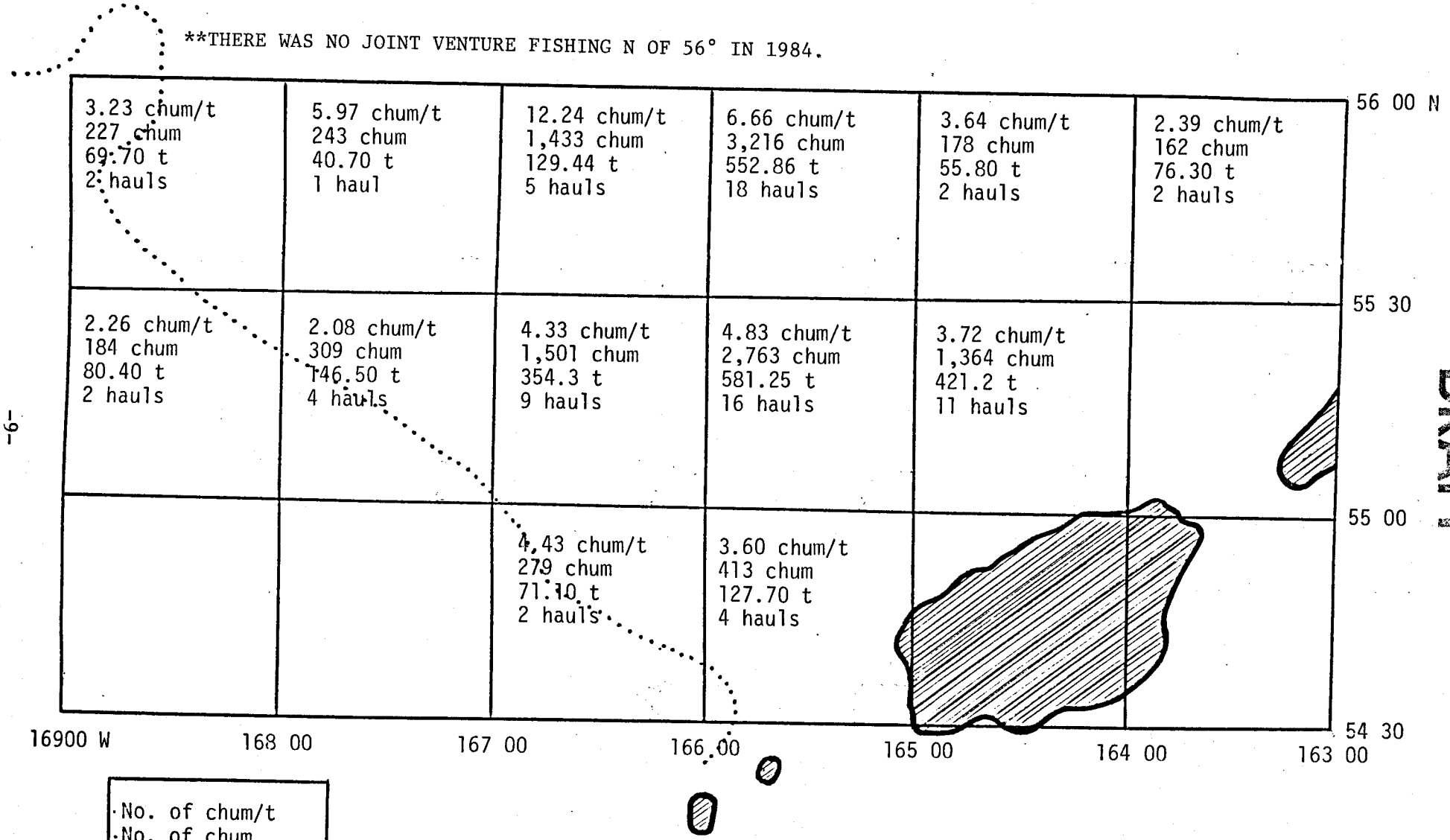
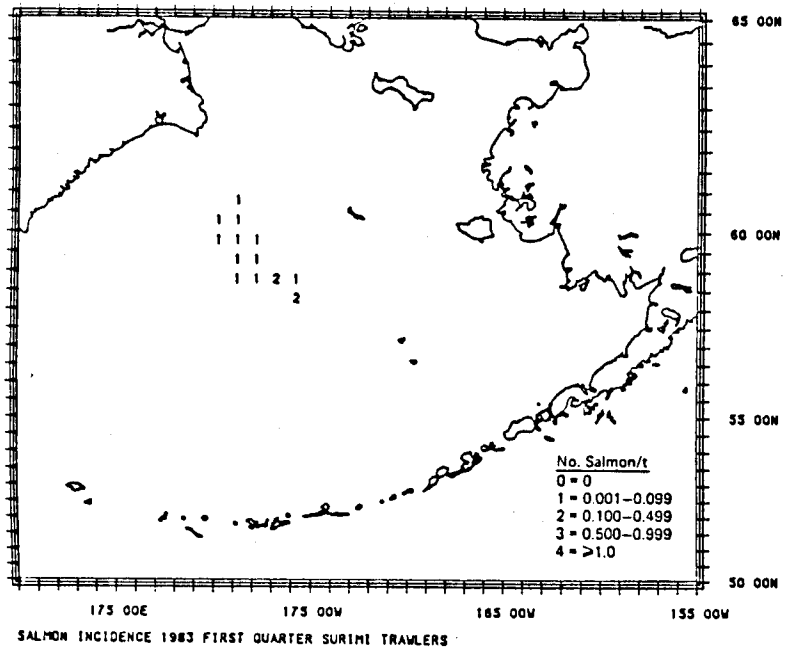
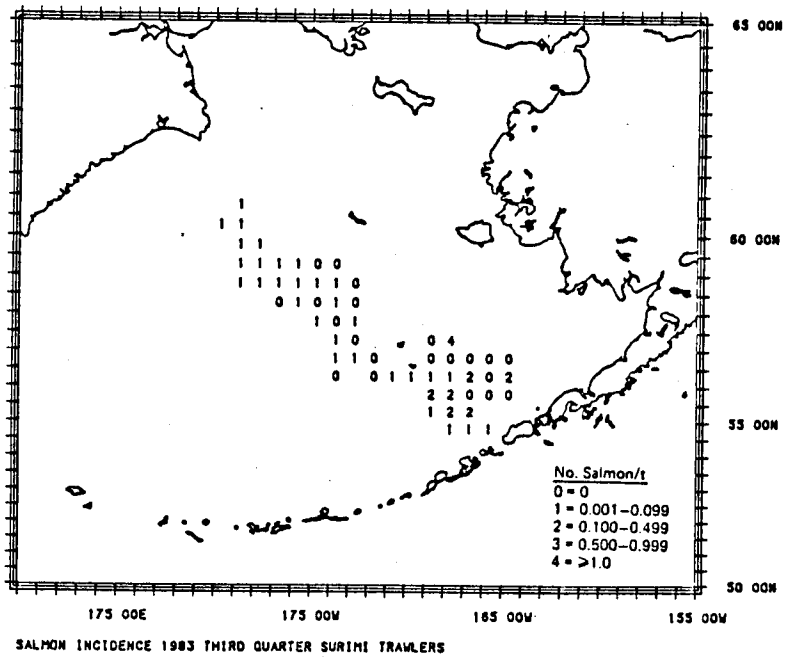


Figure 2. Catch rate and amount of chum salmon in joint-venture fisheries by statistical blocks, July-August 1984. Only hauls with more than 50 chum salmon were included.



SALMON INCIDENCE 1983 FIRST QUARTER SURIMI TRAWLERS



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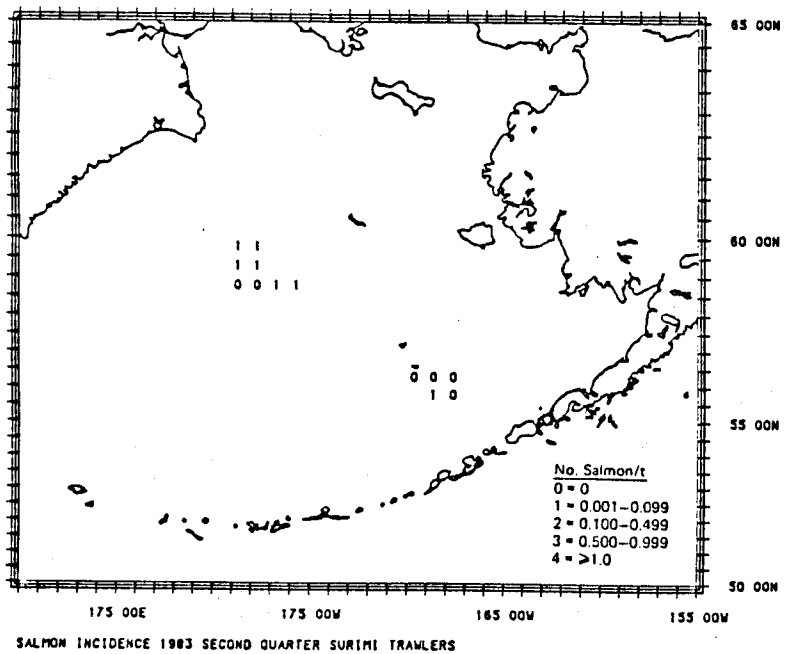

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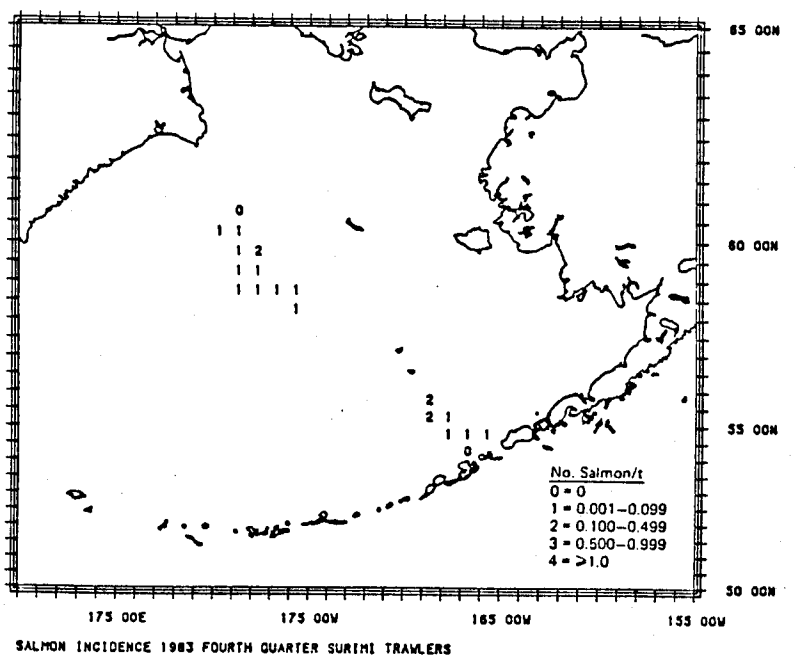
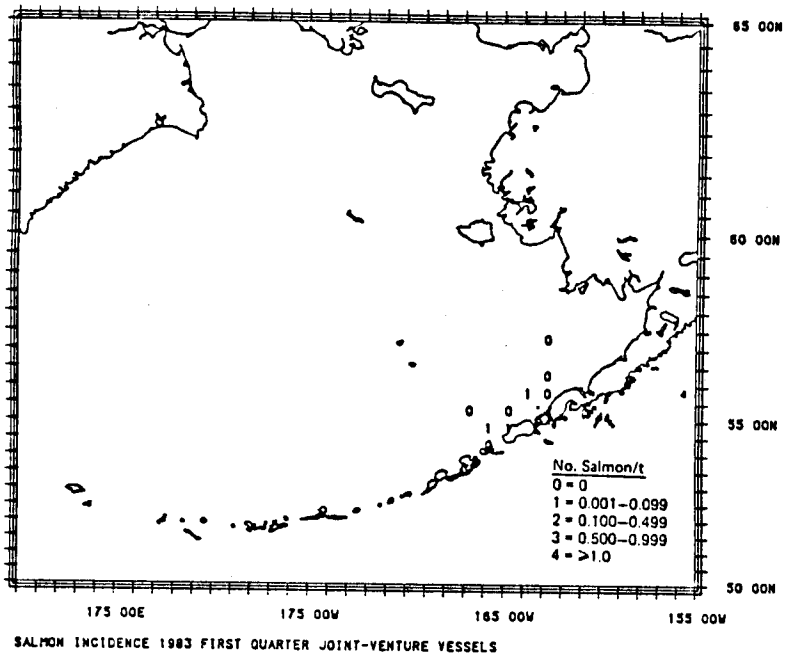
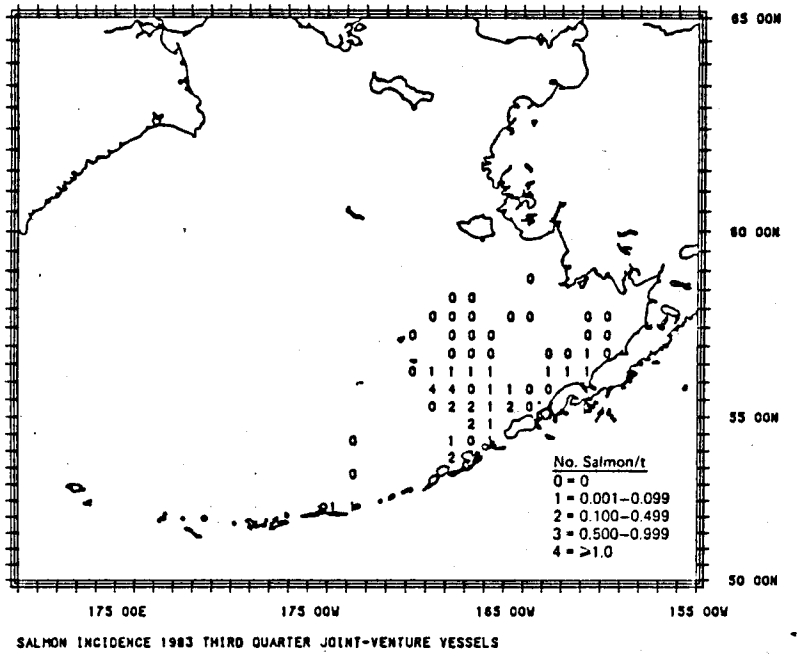
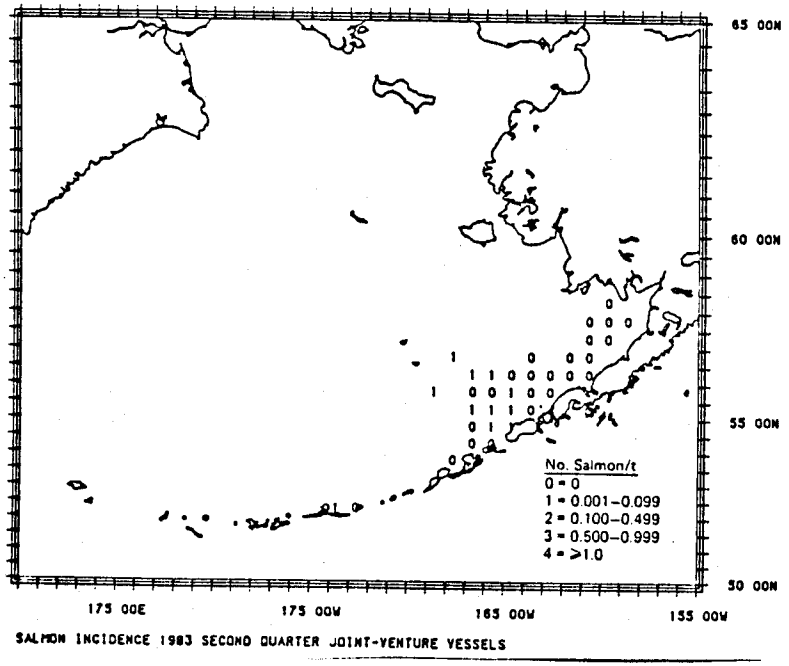


SALMON INCIDENCE 1983 FOURTH QUARTER SURIMI TRAWLERS

Figure 3 .--Average incidence (no./t) of salmon on surimi trawlers (all nations) by quarter and 1/2° lat. by 1° long. areas, 1983.







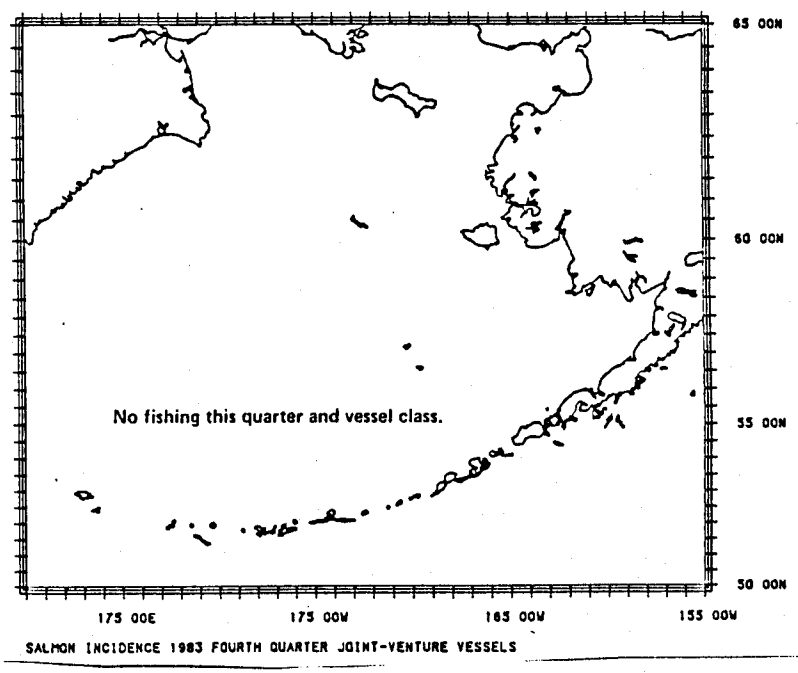


Figure 4.--Average incidence (no./t) of salmon in the joint-venture fisheries by quarter and 1/2° lat. by 1° long. areas, 1983.

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Table 5.--Estimated numbers of salmon and tonnage of groundfish landed in the Bering Sea/Aleutian region joint-venture fishery in 1984 by month and management area.

Month	Estimated Numbers of Salmon				Total Groundfish Catch			
	Total (Nos.)	1 (Nos.)	2 (Nos.)	4 (Nos.)	Total (t)	1 (t)	2 (t)	4 (t)
Jan.	3	3	-	-	269.9	269.9	-	-
Feb.	53	53	-	-	4,830.6	4,830.6	-	-
Mar.	427	427	-	-	40,437.6	40,437.6	-	-
Apr.	808	798	-	10	53,472.9	51,108.9	-	2,364.0
May	15	1	0	14	20,598.8	8,406.6	52.9	12,139.3
Jun.	228	147	0	81	57,354.1	39,997.2	2,145.7	15,211.2
Jul.	1,523	1,419	91	13	89,521.3	41,258.9	34,536.3	13,726.1
Aug.	57,008	56,909	71	28	70,991.5	54,849.4	8,073.7	8,068.4
Sep.	494	491	-	3	23,048.5	22,410.8	-	637.7
Oct.	14	14	-	-	1,197.5	1,197.5	-	-
Nov.	0	0	-	-	45.0	45.0	-	-
Dec.	-	-	-	-	-	-	-	-
Total	60,573	60,262	162	149	361,767.7	264,812.4	44,808.6	52,146.7

than 50% below escapement goals. Yukon fall chum salmon are the subject of major allocation disputes among traditional users as well.

3. ESTABLISH MEASURES TO REDUCE THE INCIDENTAL BYCATCH OF FULLY UTILIZED DOMESTIC SPECIES BY FOREIGN TRAWLERS IN THE ALEUTIAN ISLANDS

U.S. fishing and processing companies operating in the Bering Sea and Aleutian Islands have expanded dramatically in recent years. For example, in 1981 joint ventures in the Aleutian Islands caught approximately 3,800 mt of groundfish (Table 6). This catch reached 19,000 mt in 1982 and climbed to over 50,000 mt in 1984. This rapid increase in domestic harvest has led to full utilization of several groundfish species and greatly increased utilization of others. The Council has identified three species as fully utilized by U.S. fishermen: Pacific ocean perch, sablefish, and Atka mackerel. Pacific cod, while not yet fully utilized in the Aleutians, is also of great economic importance. These species have supported foreign directed fisheries in the past and, although directed fisheries have been curtailed due to reduced allocations, are still taken in varying quantities incidentally to normal groundfish trawl operations. Because these species are important to the development of the U.S. industry, reduction of foreign catches to a minimum is esessential. Modification of fishing practices can reduce these incidental catches but elimination of bycatches by that method alone is doubtful.

Table 6. Joint venture and foreign trawl catches in the Aleutian Islands (INPFC Area 4), 1981-84.

	Pollock	Pacific cod	Atka Mackerel	POP	Sablefish	All Species
Joint Venture						
1981	145	1,749	1,633	0	156	3,769
1982	1,983	4,280	12,429	2	118	19,043
1983	2,547	4,700	10,511	10	70	18,051
1984*	6,736	6,476	35,927	429	272	50,251
Foreign Trawl						
1981	55,346	2,680	15,027	3,660	172	88,362
1982	55,745	1,520	7,117	1,732	147	77,252
1983	56,453	1,870	1,097	651	155	69,663
1984*	71,452	437	71	390	115	75,473

*preliminary

Data from recent years indicate that a substantial portion of the foreign catch of these fully utilized species in the Aleutian Islands has been taken in the immediate vicinity of the islands themselves. In 1983 foreign trawlers harvested a total of 1,870 mt of Pacific cod, 155 mt of sablefish, 738 mt of Pacific ocean perch, and 1,097 mt of Atka mackerel in the Aleutian Islands (Statistical Area 4). Preliminary analysis of observer data for the 1983 fishing year indicates that approximately 92% of the trawl catches of Pacific

cod, 88% of sablefish, 92% of rockfish and 66% of Atka mackerel came from within 20 miles of the islands in 1983. The Council feels that it is important to ensure that these valuable species be harvested entirely by U.S. fishermen and is investigating measures to achieve that goal.

4. ESTABLISH A REPORTING SYSTEM FOR CATCHER/PROCESSOR VESSELS

The objective of this proposal is to ensure that fishery managers receive timely estimates of catch by all domestic vessels so that fishery closure notices can be promptly issued when OY's are achieved. With the rapid recent growth of the domestic fishing fleet, increasing importance is being placed on timely reporting of domestic harvests in order to ensure that OY's are not exceeded. Vessels which deliver their catch to shore-based processors land their catch frequently enough to allow timely estimation of total catch under existing regulations. However, vessels which process their catch at sea can remain on the fishing grounds for extended periods of time. Catch reports submitted by these vessels at the time of landing as required under existing regulations are not timely enough to prevent OY's from being seriously exceeded. The resulting overharvests could seriously damage future production from groundfish stocks.

Current fishing regulations implementing the Gulf of Alaska and Bering Sea Fishery Management Plans require fishing vessels to submit a State of Alaska fish ticket or equivalent document to the Alaska Department of Fish and Game for any commercial groundfish harvest in the Gulf of Alaska or Bering Sea within 7 days of the date of landing the catch. Vessels which preserve their catch by non-freezing refrigeration or icing methods must land their catch within a maximum of 10-12 days from the time of harvest in order to ensure product quality. The catch from these vessels, when delivered to shore- based processors, can be reported on a timely basis under existing regulations. If existing regulations are properly enforced, fishery managers can estimate harvests by these vessels with sufficient precision to ensure that OY's are not exceeded.

However, vessels which freeze or salt their catch aboard frequently remain at sea for trips of several months duration and are not currently required to report their catch until the time of landing and offloading. At least twenty two catcher/processor vessels will be operating in the Gulf of Alaska and Bering Sea areas in 1985. Based on past catcher/processor landing records the combined hold capacity of these vessels will be approximately 13,000 metric tons. Therefore these vessels are capable of harvesting significant portions or even entire OY's in a single trip. Under existing fishing regulations, fishery managers have no knowledge of the catch aboard these vessels until the time of landing. In addition, domestic groundfish fishing vessels are not required to notify fishery managers when beginning fishing operations. Domestic groundfish fishing vessels are not marked for identification from enforcement overflights, so the number of catcher/processor vessels actually fishing in a given management area is not known until the time of landing. Without knowledge of effort levels, fishery managers are not able to make projections of catch aboard based on past performance.

Delayed catch reporting is also a problem for fully domestic mothership operations. In these operations small catcher vessels without processing

capability deliver their catch, usually by cod-end transfers, to a mothership/processor vessel. Current regulations require that an ADF&G fish ticket be filled out each time a catcher vessel delivers to the mothership/processor and that these fish tickets be forwarded to ADF&G within 7 days of the date that fish were delivered. Domestic mothership and floating processor operations thus far have all occurred in sheltered waters with at least periodic access to U.S. mail service so that regulations requiring filing of fish tickets with ADF&G within 7 days could have been complied with and enforced. However, there is a potential for these mothership operations to occur at sea, with no method of filing the fish tickets with ADF&G within the 7 day period required by law.

With such large processing capacities and increasing numbers of catcher/processor and mothership/processor vessels the risks of overharvesting groundfish resources under the current system are high. Because of the time delays involved in catch reporting under current regulations, groundfish resources could be drastically overharvested before fishery managers had even discovered that OY's had been exceeded. Since many of the groundfish species concerned are slow growing and long-lived, overharvesting can have considerable impacts on future production.

5. IMPLEMENTATION OF THE NMFS HABITAT POLICY

The proposed action amends the FMP by modifying and adding certain sections specifically to address the habitat requirements of individual species in the Bering Sea/Aleutian Islands groundfish fishery. The amendment describes the diverse habitat types within the Gulf of Alaska, delineates the life stages of the species, identifies potential sources of habitat degradation and the potential risk to the fishery, and describes existing programs, applicable to the area, that are designed to protect, maintain, or restore the habitat of living marine resources. The amendment responds to the Habitat Conservation Policy of the National Marine Fisheries Service, which advocates emphatic consideration of habitat concerns in the development or amendment of FMP's, and the strengthening of NMFS' partnerships with states and the councils on habitat issues.

III. ALTERNATIVE MANAGEMENT MEASURES INCLUDING THOSE PROPOSED

1. INCREASE THE UPPER END OF THE OY RANGE

A. (Alternative 1 = proposed). Increase the upper end of the OY range to 2.5 million mt.

This alternative would provide the Council and the Secretary broader flexibility to make groundfish available for harvest during years when the biological status of stocks justified a harvest larger than 2.0 million mt.

B. (Alternative 2 = status quo). Maintain the upper end of the OY range at its current level of 2.0 million mt.

This alternative maintains the conservative management system that was implemented by Amendment 1 to the FMP. It provides the Council and the Secretary with flexibility to make groundfish available for harvest up to but

not above 2.0 million metric tons when the status of stocks would justify a larger harvest.

2. REDUCE THE INCIDENTAL CATCH OF CHUM SALMON BY JOINT VENTURE TRAWLERS

Two management alternatives and the status quo may be considered to reduce the incidental catch of salmon.

A. (Alternative 1 = proposed). Close the area from 55°N-56°30'N latitude between 164°W-169°W longitude from July 20-August 25.

This alternative would respond to the problem identified in the above Statement of Need. In 1983 the highest catch rates of salmon (number of salmon per metric ton of groundfish) occurred from 54°N- 56°N latitude between 166°W-169°W longitude. In 1984 the largest catches (in total numbers) occurred from 55°-56°N between 165°-166°W. The majority of the catch occurred from 55°-56°N between 164°W-167°W. As in 1983, more than 92% of the incidental salmon catch by joint venture vessels occurred in July and August.

B. (Alternative 2). Close the same area during the same time period if a prohibited species catch (PSC) limit is reached.

This alternative would also respond to the identified problem, but would result in somewhat fewer salmon being saved (depending primarily on the the PSC limit). However it would allow fishermen the opportunity to modify their fishing gear and/or techniques in order to reduce their incidental catch and remain in the area. It is not certain how fishermen would respond to a PSC limit. Perhaps they would switch from pelagic trawling, i.e. pulling their nets above the ocean floor and preventing the gear from touch the bottom, to bottom trawling, i.e. dragging their nets in fairly constant contact with the ocean floor. This would be likely to increase the incidental catch of other prohibited species, primarily Pacific halibut (Hippoglossus stenolepis) and Tanner crab (Chionoecetes bairdi). However, other groundfish trawl fisheries in this area and throughout the region also use bottom trawls, and this area is not known to have above average densities of crab and halibut. It is unlikely that the total catch of these two species will increase significantly.

C. (Alternative 3 = Status Quo).

Current regulations require fishermen to immediately release all salmonids with a minimum of injury and to minimize their total catch of salmon. No specific bycatch limitations are placed on domestic and unless joint venture trawlers modify their fishing gear, and/or techniques, it is likely that the incidental catch will continue to increase. Joint venture trawlers are expected to increase their pollock catch from about 250,000 mt in 1983 to nearly 400,000 mt in 1985, and this area has extremely high densities of pollock and associated high catch rates. Thus, the amount of pollock fishing in July and August in this area will undoubtedly increase.

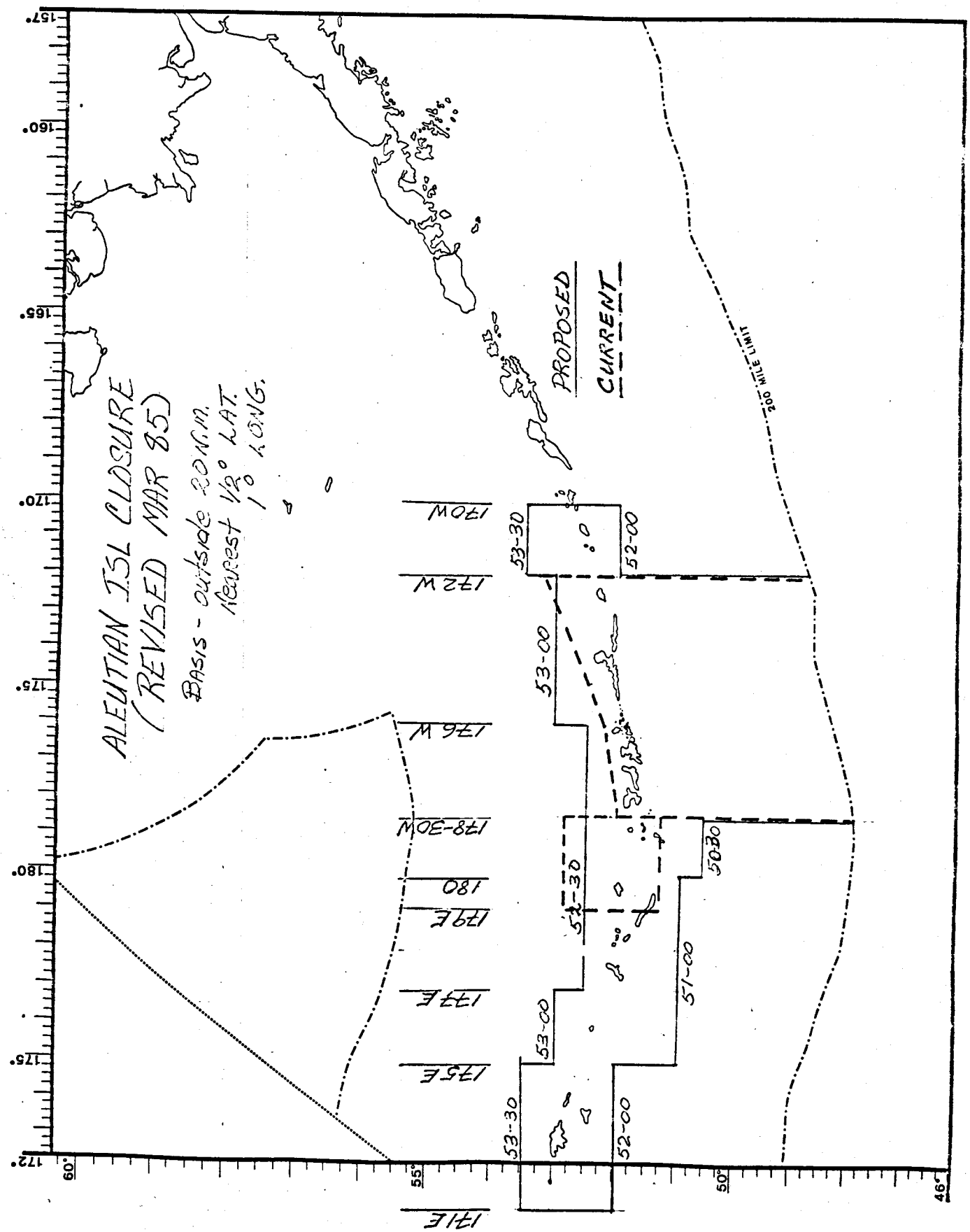
ALEUTIAN ISL CLOSURE
(REVISED MAR 85)
BASIS - outside 200 N.M.
Nearest 1/2° LAT.
1° LONG.
PROPOSED
CURRENT
200 MILE LIMIT
170W
172W
176W
178-30W
180
179E
177E
175E
173E
53-30
52-00
53-00
52-30
50-30
51-00
157°
160°
165°
170°
175°
180°
172°
60°
55°
50°
46°

FIGURE 5

3. REDUCE THE INCIDENTAL BYCATCH OF FULLY UTILIZED DOMESTIC SPECIES BY FOREIGN TRAWLERS IN THE ALEUTIAN ISLANDS

A. (Alternative 1 = proposed) Prohibit foreign trawling within 20 miles of the Aleutian Islands.

Under this alternative, foreign trawl catches of Pacific cod, sablefish, Pacific ocean perch, and Atka mackerel would be reduced, thus making them more available to domestic fishermen. The exact location of the proposed closure is shown in Figure 5.

B. (Alternative 2) Allow foreign trawlers to fish in those areas around the Aleutians that are currently open to such fishing.

Under this status quo alternative, foreign nations could continue to trawl for their share of groundfish quotas that are apportioned to TALFF, including bycatch amounts of Pacific cod, sablefish, Pacific ocean perch, and Atka mackerel. Each nation would be subject to early closures of its fishery it its share of these limiting species were caught.

C. (Alternative 3) Establish zero TALFFs for all species in the Aleutians (all of Area IV) except pollock.

This alternative in effect would expand the closure around the Aleutians and also include all foreign vessels rather than just trawlers. Bycatch allowances would be available (as TALFF) for those species not fully utilized by U.S. fishermen. The primary bycatch is expected to be pollock. Zero TALFFs for other species would mean they are prohibited species. Catch of those species would be unrestricted by regulation but would be low because pollock would be the only target species. Prohibited species catches could not be retained.

This alternative differs from the status quo in that currently separate TACs (and thus separate TALFFs) are established only for sablefish, Pacific ocean perch, rockfish and pollock. Under this alternative, TACs for all other species except pollock will remain unchanged but TALFFs will be available only outside Area IV. Pollock TAC inside Area IV will remain available inside Area IV.

4. ESTABLISH A REPORTING SYSTEM FOR CATCHER/PROCESSORS

A . (Alternative 1 = proposed). Require an FCZ processing permit with check- in/check-out and weekly catch reporting.

Under this alternative, catcher/processor and mothership/processor vessels would be required to obtain an FCZ processing permit. These catcher/processor and mothership/processor vessels would be required to notify NMFS via U.S. Coast Guard radio each time they entered or left an FMP management area. Catcher/processor and mothership/processor vessel operators or their representatives would also be required to submit a report to NMFS by Coast Guard radio, U.S. mail, or telex for each fishing week documenting the hail weight estimates of catch by FMP species group in each FMP area. These weekly reports would be due within 7 days of the end of the fishing week. ADF&G fish

tickets would continue to be required to be submitted within one week of the date of landing to document more precise catch or product weights and specific ADF&G statistical areas. A completed logbook may be submitted with the ADF&G fish ticket showing total catch by species for a trip as a means of documenting catch by specific ADF&G statistical area.

B. (Alternative 2 = status quo). Maintain the current reporting requirements.

With the present system catches are reported on ADF&G fish tickets at the time of landing.

C. (Alternative 3). Require an FCZ processing permit with a weekly catch report, but without check-in/check-out reporting.

Under this alternative, catcher/processor and mothership/processor vessels would be required to obtain an FCZ processing permit. These catcher/processor and mothership/processor vessel operators or their representatives would be required to submit a report to NMFS by Coast Guard radio, U.S. mail, or telex for each fishing week documenting the hail weight estimates of catch by FMP species group in each FMP area. These weekly reports would be due within 7 days of the end of the fishing week. ADF&G fish tickets would continue to be required to be submitted within one week of the date of landing to document more precise catch or product weights and specific ADF&G statistical areas. A completed logbook may be submitted with the ADF&G fish ticket showing total catch by species for a trip as a means of documenting catch by specific ADF&G statistical area.

D. (Alternative 4). Place observers aboard a portion of the catcher/processor and mothership/processor vessels and extrapolate the catch from these vessels to the entire fleet.

Under this alternative, catcher/processor and mothership/processor vessels would be required to obtain an FCZ processing permit which would require that observers be allowed onboard if requested. These catch/processor and mothership/processor vessels would be required to notify NMFS via U.S. Coast Guard radio each time they entered or left an FMP management area. Observers would be placed aboard a portion of the catcher/processor and mothership/processor vessels. Radio reports of catch from the observed sample would be extrapolated to all vessels in each management area. ADF&G fish tickets would continue to be required to be submitted within one week of the date of landing to document more precise catch or product weights and specific ADF&G statistical areas. A completed logbook may be submitted with the ADF&G fish ticket showing total catch by species for a trip as a means of documenting catch by specific ADF&G statistical area.

E. (Alternative 5) Place observers aboard all catcher/processor and mothership/processor vessels.

Require catcher/processor and mothership/processor vessels to obtain an FCZ processing permit which would require that an observer be aboard at all times. Total catch would be computed directly from observer radio reports.

5. IMPLEMENTATION OF THE NMFS HABITAT POLICY

A. (Alternative 1 = proposed). Amend the FMP to address habitat considerations, based on the best available information, to meet standards set forth in the National Marine Fisheries Service's Habitat Conservation Policy.

This alternative focuses, within the FMP, on habitat as the source of productivity of a fishery and demonstrates Council awareness of potential adverse and cumulative effects of man-induced habitat alterations on the health of stocks and size of the harvest. It would provide legal foundation for future Council expressions of concern and action should the need arise, and would provide the Secretary with a basis for implementing appropriate Council habitat recommendations to the extent possible within legal and budget limitations.

B. (Alternative 2 = proposed). Amend the FMP to add a general habitat conservation objective. However, the more detailed material that is under the Alternative 1 proposed amendment would be included in a separate Council Habitat Document that would be referenced in, but not part of, the FMP.

This alternative would issue the amendment text as a Council Habitat Document separate from, but referenced in the FMP. Not subject to Secretarial approval, it would provide essentially the same information without the need for FMP amendment should the information change. Whether future Council action based on information published separately from the FMP would have the same legal effect is uncertain and is being evaluated.

C. (Alternative 3 = status quo). Do not amend the FMP to address habitat considerations.

Under this alternative, the FMP would not be responsive to the NMFS Habitat Conservation Policy.

IV. ENVIRONMENTAL IMPACTS OF THE AMENDMENT PROPOSALS AND THEIR ALTERNATIVES

Environmental impacts on the quality of the human environment are categorized as biological, physical, and socioeconomic. The socioeconomic analysis is presented under the draft Regulatory Impact Review/Initial Regulatory Flexibility Analysis prepared for Amendment 10. Biological and physical impacts are discussed as follows:

1. INCREASE THE UPPER END OF THE OY RANGE.

Impacts caused by a change in the OY range are categorized as stress to groundfish populations, stress to marine mammals, stress to marine birds, and physical changes as a direct result of on-bottom fishing practices, and nutrient changes due to processing and dumping of fish wastes. These impacts are discussed as follows:

A. Increase the upper end of the optimum yield range to 2.5 million mt.

Stress To Groundfish Populations

The EY for the groundfish complex is usually calculated on a species-by-species basis and summed for the groundfish complex. These calculations account for amounts consumed by other groundfish, i.e., fisheries are only allowed on surplus production, which should not adversely impact the wellbeing of groundfish populations directly. When TAC is set equal to EY for the complex, achievement of the EY for all species simultaneously is impossible for the multispecies trawl-dominated fishery. Consequently, total catches should never achieve the combined EY's for the groundfish complex. Since the estimates of EY will continue to form the biological limit for setting of TAC's for the groundfish complex, the present management system will always assure maintenance of a larger resource biomass than otherwise would be the case and a "biological cushion" will always exist to compensate for variations and errors in EY determinations. If the OY range is changed to 1.4-2.5 million mt, the Council would have greater management flexibility to more fully utilize the resource when stock conditions warrant it. The Council would not be required, however, to set TAC equal to EY whether or not the OY range is changed. The Council could still consider such factors as biological, environmental, and socioeconomic in setting TAC's below, at, or above EY's.

Stress to Marine Mammals

The pinniped species that are found in the Bering Sea/Aleutians are all protected by the Marine Mammal Protection Act of 1972 (MMPA). All species are believed to be at their level of optimum sustainable population as defined under the MMPA so that permits for their taking may be issued under carefully limited circumstances. Because groundfish trawl operations generally do involve conflict with pinnipeds, domestic and foreign fishermen proposing to engage in such operations must obtain Certificates of Inclusion under a general permit for the taking of marine mammals incidental to commercial trawling operations. Under the general permit not more than northern sea lions (Eumetopias jubatus), northern fur seals (Callorhinus ursinus), harbor seals (Phoca vitulina), and small cetaceans may be killed or seriously injured annually by domestic trawl operations off Alaska.

Numbers of marine mammals taken in the eastern Bering Sea during 1984 were well within the limits provided by the Certificates of Inclusion. A total of 73 and 96 marine mammals were reportedly taken during the joint venture and foreign fisheries, respectively. U.S. fishermen now have several years of experience in the Bering Sea groundfish fishery and are mostly familiar with the protection afforded marine mammals. Because marine mammals are usally highly visible during daytime, fishermen are able to avoid them while trawling, thus minimizing confrontations. Observations by the National Marine Fisheries Service suggest, however, that trawling conducted during periods of darkness is likely to increase encounters with marine mammals. Potential methods to reduce such encounters include (1) scheduling fishing operations to reduce or eliminate the need to trawl during periods of darkness, and (2) adopting certain technical devices, e.g.. noise emitters, that would repel marine mammals in the vicinity of the a trawl. Fishermen should be encouraged continually to consider and adopt such measures to mitigate the effect of their operations on sea lions in order to enjoy fishing activities without additional measures that could be imposed on them under the Marine Mammal Act.

Ecosystem models that were used to calculate MSY for the groundfish complex take into account the competition for food that occurs between marine mammals and commercial fishing operations. Therefore, raising the OY or TAC to 2.5 million mt. should not deprive food for marine mammal populations. Eleven species of marine mammals (Table 7) and eight fish species or fish groups in the eastern Bering Sea could be affected by commercial fishing (Proceedings of the Workshop on Biological Interactions Among Marine Mammals and Commercial Fisheries in the Southeastern Bering Sea, and Alaska Sea Grant Report (University of Alaska 1984).

Table 7. Marine mammals and commercial fish species in the Eastern Bering Sea that interact as a result of commercial fishing operations.

Marine mammals	Fish species
Northern fur seal (Callorhinus ursinus)	Pollock
Steller sea lion (Eumetopias jubatus)	Pacific cod
North Pacific walrus (Odobenus rosmarus)	Yellowfin sole
Harbor seal (Phoca vitulina)	Turbot
Spotted seal (Phoca largha)	Other flounders
Ribbon seal (Phoca fasciata)	Halibut
Bearded seal (Erignathus barbatus)	Rockfish
Beluga whale (Delphinapterus leucas)	Sablefish
Dall porpoise (Phocoenoides dalli)	
Harbor porpoise (Phocoena phocoena)	
Gray whale (Eschrichtius robustus)	

Types of interactions between marine mammals and commercial fishing operations are divided into four categories as follows:

a) Direct effects on marine mammals from shooting, harassment, incidental entanglement during fishing operations, and/or entanglement in lost or discarded fishing gear;
b) Direct effects on fisheries when marine mammals take or damage caught fish, and/or damage fishing gear;
c) Indirect effects on marine mammals caused by fisheries reducing the quantity or quality of prey species available to marine mammals; and
d) Indirect effects on fisheries caused when marine mammals reduce the quantity or quality of fish available to fisheries.

Except for entanglement in lost or discarded fishing gear, direct interactions are reasonably well documented and/or are the subject of ongoing or planned assessment. Categories c) and d), indirect ecological

interactions as a result of changes in predators and prey species, are less well understood. Many of the marine mammals feed on juvenile and adult groundfish and also on the same animals that the same groundfish feed on. Harvesting an increased amount of groundfish should not leave a deficit of fish in the system that marine mammals would then forego, because the groundfish stocks themselves would have increased. Theoretically, these increases in allowable levels of harvest should have a zero net effect on marine mammals; in reality, predator/prey relationships are not well understood and any resulting changes are not possible to measure against natural perturbations in the ecosystem, given the existing technology to measure them.

Interactions are most common in the following combinations of marine mammals and commercial fisheries:

Northern fur seal -- pollock/cod
Steller sea lion -- pollock/cod; yellowfin sole/flounder
Harbor seal -- yellowfin sole/flounder

The nature of these interactions are summarized as follows:

Northern Fur Seal and the Pollock/Cod Fishery - Fur seals prey primarily upon the one- and two- year-old-classes of pollock, whereas the fishery preferentially takes the larger size-and age-classes of pollock. Ecological interactions likely are greatest in the vicinity of the Pribilof Islands during the fur seal pupping/breeding season. The Pribilof Island fur seal population has been declining since the mid-1950's. The harvest of females in the late 1950's and early 1960's accounts for much of the decline; and, while not proven, entanglement in lost or discarded fishing gear could be a major cause of the continued decline. Obtaining the necessary biological/ecological information to predict the probable numerical and functional relationships between the northern fur seal population, the pollock/cod fishery, and the affected fish stocks would be difficult and perhaps impossible. In such cases, baseline/monitoring programs should be conducted to detect and monitor possible harvest-caused changes in key population or system parameters.

Steller Sea Lion and the Pollock/Cod Fishery - Steller sea lions apparently are caught and killed in lost and discarded fishing gear. Unlike the northern fur seal, the Steller sea lion is present in the eastern Bering Sea year-round. The distribution, origins, trends and diet of Steller sea lions in the Bering Sea are not well documented. What little is known about their diet is from outside the Bering Sea and indicates that all sizes of pollock, 5 cm to 60 cm, are eaten. Some dietary informtion is from animals caught incidentally in the cod end of trawl nets and may be biased since sea lions are known to be attracted to, and feed in, the vicinity of fishing and processing vessels. Too little is known about entanglement in lost and discarded fishing gear and about the distribution, feeding habits, and food requirements of Steller sea lions in the eastern Bering Sea to do more than speculate about the possible direct and indirect effects of the pollock/cod fishery on the eastern Bering Sea population(s) of Steller sea lions.

Steller Sea Lion and the Yellowfin Sole/flounder Fishery - Little information exists on the diet of sea lions in the Bering Sea. However, flounders are

known to be insignificant in the diet of sea lions in the Gulf of Alaska, and therefore believed to be insignificant in the Bering Sea, also. Although approximately 8 percent of the estimated standing stock of yellowfin sole is harvested annually, a flounder harvest of any size is not likely to affect sea lions.

Harbor Seal and the Yellowfin Sole Fishery - The harbor seal is a coastal species inhabiting nearshore areas where foreign fisheries are prohibited or restricted to joint ventures with U.S. fishermen. Thus, harbor seals probably have not affected the yellowfin sole fishery or be affected by the yellowfin sole fishery unless there is a substantial expansion of the domestic sole or other nearshore fisheries in the eastern Bering Sea. The nature and size of inshore domestic fisheries, the movements, feeding habits, and diet of harbor seals, the existence, location and characteristics of definable harbor seal feeding areas, and the genetic relationship between harbor seal colonies in the eastern Bering Sea and elsewhere are not well documented.

Changes in optimum yields are calculated to account for amounts consumed by marine mammals, i.e., fisheries are only allowed on surplus production, which should not impact directly marine mammals. On the other hand, certain conflicts occur between marine mammals and fishermen as a result of both "predators" being on the same grounds, sometimes in direct competition with each other.

Stress to Marine Birds

Harvesting operations during the groundfish fisheries may cause marine birds, including those protected by the Migratory Bird Treaty Act, to avoid areas that they might otherwise frequent. Such displacement of these birds would not appear to be a prohibited taking for purposes of the Migratory Bird Treaty Act, but its long-term effect on them is largely unknown. Birds protected under this act could theoretically be captured in trawl gear in the course of their feeding activities. Any such capture that is intentional or negligently caused by fishermen would be a violation of this Act.

As with marine mammals, many of the marine birds that occur in the Bering Sea/ Aleutians feed on juvenile and adult groundfish and also on other animals that the same groundfish feed on. Harvesting an increased amount of groundfish should not leave a deficit of fish in the system that marine birds would then forego, because the groundfish stocks themselves would have declined. These increases in allowable levels of harvest should have a zero net effect on marine birds, but these relationships are not well understood.

Physical changes As a Direct Result Of On-bottom Fishing Practices

Under this alternative an additonal 500,000 mt could be harvested. Depending on the species, this harvest could entail certain combinations of trawls (on-bottom and midwater), longlines, pots, and gillnets. Only the bottom trawl has been identified as a gear type that impacts the bottom. It may cause abrasion of the bottom as it is pulled along, killing or injuring any animals and plant life that may have been in its path. Most bottom trawls are also equipped with rollers, or bobbins, that protect the trawl from damage, but which may also kill or injure animals and plant life. The actual severity of

such impacts are not known, but are largely believed to be insignficant over the long term, given the capacity of the ecosystem to repair itself.

Nutrient Changes Due to Processing and Dumping Fish Wastes

Under this alternative, 2.5 million mt of groundfish could be caught. Assuming a recovery rate of 30 percent, this harvest could result in 1.75 mt of fish wastes, or 0.35 million additional metric tons, being discarded at sea compared to 1.4 mt of wastes that could be discarded in association with a 2.0 million mt harvest. This additional amount represents a 25 percent increase. Processes of change in the ocean are dynamic given the biological and physical interactions that occur. An assessment of the true effects caused as a result of this increase are not quantifiable given present technology.

B. Maintain the upper end of the OY range at 2.0 million mt.

Impacts caused by maintaining the upper end of the OY range at 2.0 million mt fall under the same categories as under the proposed alternative, i.e. direct stress to marine mammal and bird populations, changes in predator/prey relations between vertebrates and invertebrates, and changes in status of marine mammals and birds, physical changes as a direct result of on-bottom fishing practices, and nutrient changes due to processing and dumping of fish wastes. These impacts are discussed as follows:

Stress to Groundfish Populations

Assuming results of population models or biological surveys show the total annual harvest should be set at no more than 2.0 million mt, then the same types of impacts on groundfish should occur. These impacts, however, would likely be reduced proportionately. Such a reduction in impacts would be expected, because calculations of the annual OY would already have factored in the biological requirements of groundfish populations. Unpredictable, however, are the following variables in the ecosystem: temperature, currents, light, availability of primary and secondary nutrients, and subtle changes in predator/prey relationships. These variables make accurate predictions of stock conditions on the basis of modeling difficult. If conditions of stocks improved in any one year to justifiy a harvest of more than 2.0 million mt, then certain amounts of fish will be left on the grounds. This unharvested surplus would be consumed by animals, which would introduce some instability, since the ecosystem would respond by increasing its production until the ecosystem came back into equilibrium.

Stress to Marine Mammals and Birds

As with groundfish populations, the same types of impacts on groundfish should occur. If conditions of stocks improved in any one year to justifiy a harvest of more than 2.0 million mt, then certain amounts of fish will be left on the grounds. This unharvested surplus would be consumed by marine mammals and birds, introducing some instability until the system responded by increasing its production.

Food Competition with Marine Mammals and Birds

Under this alternative, fishermen would be limited to no more than 2.0 million mt. During some years when the condition of stocks would allow a harvest of more than the upper limit of 2.0 million mt, a surplus of groundfish biomass would be available in the system. Competition between fishermen and marine mammals and birds would be lessened during such years.

Nutrient Changes Due to Processing and Dumping Fish Wastes

Under this alternative, 2.0 million mt of groundfish could be caught. Assuming a recovery rate of 30 percent, this harvest could result in 1.4 million mt of fish wastes, or 0.35 million fewer metric tons, being discarded at sea compared to 1.75 million mt of wastes that could be discarded in association with a 2.5 million mt harvest. This lesser amount represents a 20 percent increase. Processes of change in the ocean are dynamic given the biological and physical interactions that occur. An assessment of the true effects caused as a result of this decrease are not quantifiable given present technology.

2. REDUCE THE INCIDENTAL CATCH OF CHUM SALMON BY JOINT VENTURES

No significant changes in predator-prey relationships among vertebrates or invertebrates are expected to occur under any of the alternatives being considered, other than those anticipated and analyzed in the Environmental Impact Statement for the FMP. Joint venture fishing activity has replaced foreign fishing activity and not been in addition. Shifts between areas may lead to minor changes in localized abundance of certain stocks, primarily those of commercial importance to the trawl fishing industry. No physical changes in the environment are anticipated. No increased direct stress to marine mammals or birds is expected, nor is any change in indirect stress anticipated. If trawling practices change within the area of concern, such as shifting from midwater to bottom trawling, some changes in the composition of the benthic community may occur. Any such changes are expected to be minor.

The stock origin of the chum salmon being intercepted by joint ventures is unknown at this time. A wide variety of stocks is probably in the area during July and August. Stock origin studies based on scale pattern analysis and limited high seas tagging have been conducted in nearby areas, but these studies have focused primarily on maturing fish during May, June, and early July. These studies have indicated a mix of Asiatic (primarily Japanese) and Alaskan stocks are present in the Bering Sea and Aleutian Islands and that this mix varies from area to area and from time to time. Chum salmon exhibit an extraordinary migratory nature, as evidenced by the single coded-wire tag recovery by U. S. observers onboard a joint venture processing ship. That tag came from a hatchery in Hood Canal (Puget Sound), Washington.

The vast majority of chum stocks in the western Alaska area are in very healthy condition, some at or near record levels. It is possible that a portion of these intercepted chum salmon are from depressed stocks such as certain Yukon River fall chum stocks, however. Given the small percentage of the total western Alaska chum population that could be involved, it is unlikely that this incidental catch would contribute significantly to this depressed condition. It appears rather that this is primarily an allocation issue, and this aspect is dealt with in more detail in the Regulatory Impact Review.

3. REDUCE THE BYCATCH OF FULLY UTILIZED DOMESTIC SPECIES BY FOREIGN VESSELS IN THE ALEUTIAN ISLANDS AREA.

The environmental impacts of replacing foreign trawling with domestic fishing (mostly trawling) are expected to be negligible. No increased direct stress to marine mammals and birds is expected. No changes in the effects on endangered species or the coastal zone are expected. This issue is primarily allocational in nature and is considered in greater detail in the Regulatory Impact Review.

4. ESTABLISH A REPORTING SYSTEM FOR CATCHER/PROCESSORS

The primary effects imposed upon the biological and physical environment by the catcher/processor reporting alternatives result from the varying potential for overfishing under each alternative. Both targetted groundfish species and non-targetted incidental or prohibited species could be overfished by catcher/processor and mothership/processor vessels. Since many of the groundfish species concerned are slow growing and long-lived, overharvesting can have considerable impacts on future population levels and production of the targetted groundfish species. Similar effects on population levels and production are possible for incidental and prohibited species catches by these vessels. In addition, considerable socio-economic impacts on catches by other user groups could result from excessive harvests of prohibited species by catcher/processors, particularly for crab, salmon and halibut. Secondary biological impacts of overharvests would result from changes in trophic interactions caused by the altered population levels of the overfished species.

The potential for resource depletion through overfishing results from the large hold capacities of the catcher/processor and mothership/processor vessels and the potential for these vessels to remain at sea for long periods of time. Under alternative 1, fishery managers have no knowledge of the catch aboard these vessels until the time of landing. By the time these vessels land, OY's and possible PSC levels could have been greatly exceeded by the aggregate catch aboard the catcher/processor vessels and shore-based domestic vessels. Alternative 2 would greatly reduce the risk of overfishing of targetted groundfish species by requiring weekly catch reports from the catcher/processor and mothership/processor vessels. In addition, this alternative requires vessels to check-in and check-out of each management area fished. This requirement increases the compliance and enforceability of this alternative, further reducing the risk of overfishing. Alternative 3 would require only the weekly catch report, with a somewhat larger risk of overfishing of targetted groundfish species, because of reduced compliance and enforceability. The risk of overfishing is also increased under alternative 3 because the precision of catch estimates is reduced. This results from catch projections for the most recent two week reporting period being based on a two week old effort distribution provided by the preceding catch report, rather than basing the effort distribution on current information from the check-in/check-out system. The onboard observer catch reporting of alternatives 4 and 5 provide the least risk of overfishing targetted groundfish species. Observer based catch reporting provides the only reduction of the risk of overfishing prohibited species catches of the alternatives.

5. IMPLEMENT THE NMFS HABITAT POLICY

Implementation of the NMFS habitat policy is not mandated by law; however, it may be useful to educate the public about the interactions between the aquatic and benthic environments and the fishery resources. This amendment is primarily descriptive in nature, focusing on the environment within which the product for harvest is generated and nurtured. It's purpose is to alert users of the marine environment to the elemental influence of habitat on the productivity of the fishery and to the potential for alteration by man's actions. The intended effect is to provide the basis for a common awareness among these users and for appropriate expressions of Council concern should the need arise. Because this statement is primarily informational, there is no immediate environmental impact, although the residual effect of increased knowledge may serve, in the long-term, to protect, maintain, or restore the habitats of the Bering Sea groundfish fishery. In the absence of such an amendment, the benefits of increased public awareness of habitat issues would be lost.

V. EFFECTS ON ENDANGERED SPECIES AND ON THE ALASKA COASTAL ZONE

None of the alternatives for each managment proposal would constitute actions that "may affect" endangered species or their habitat within the meaning of the regulations implementing Section 7 of the Endangered Species Act of 1973. Thus, consultation procedures under Section 7 on the proposed actions and their alternatives will not be necessary.

Also, for the reasons discussed above, each of the alternative managment measures would be conducted in a manner consistent, to the maximum extent practicable, with the Alaska Coastal Zone Management Program within the meaning of Section 307(c)(1) of the Coastal Cone Management Act of 1972 and its implementing regulations.

VI. FINDINGS OF NO SIGNIFICANT IMPACT

For the reasons discussed above, it is hereby determined that neither approval and implementation of any of the reasonable alternatives concerning the six topics presented would significantly affect the quality of the human environment, and that the preparation of an environmental impact statement on these actions is not required by Section 102(2)(C) of the National Environmental Policy Act or its implementing regulations.

_____ _____

Assistant Administrator for Fisheries, NOAA Date

VII. COORDINATION WITH OTHERS

The following persons were consulted during the preparation of this environmental assessment: Dr. Loh-Lee Low, Northwest and Alaska Fishery Center, NMFS, Seattle, Washington and Patrick J. Travers, Alaska Regional Counsel, NOAA, Juneau, Alaska.

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DRAFT

North Pacific Fishery Management Council
Fishery Management Plan for the
Bering Sea/Aleutian Islands Groundfish Fishery

Outline for Habitat Sections of
Amendment #9

[4.0 Introduction to the Plan. 4.1 Description of Management Unit.]

4.2 Goals for Management Plan.
1. [Replace with habitat goal.]

* * * * * *

[9.0 Biological and Environmental Characteristics of the Fishery.]

9.8 Description of Habitat of Bering Sea/Aleutian Island Groundfish Stocks: Introduction.
- 9.8.1 Description of habitat types.
- 9.8.2 Habitat requirements.
  - 9.8.2.1 Walleye pollock.
  - 9.8.2.2 Pacific cod.
  - 9.8.2.3 Yellowfin sole.
  - 9.8.2.4 Greenland turbot.
  - 9.8.2.5 Other flatfishes.
  - 9.8.2.6 Pacific ocean perch.
  - 9.8.2.7 Other rockfishes.
  - 9.8.2.8 Sablefish.
  - 9.8.2.9 Atka mackerel.
  - 9.8.2.10 Squid.
  - 9.8.2.11 Pacific halibut.
- 9.8.3 Habitat areas of particular concern.
- 9.8.4 Potential for habitat alteration.
  - 9.8.4.1 Oil and gas development.
  - 9.8.4.2 Coastal development and filling.
  - 9.8.4.3 Marine mining.
  - 9.8.4.4 Derelict fragments of fishing gear and general litter.
  - 9.8.4.5 Organic discharge.
  - 9.8.4.6 Ocean discharge and dumping.
  - 9.8.4.7 Benthic habitat damage by bottom gear.
  - 9.8.4.8 Contamination by heavy metals.
- 9.8.5 Habitat protection: existing programs.
  - 9.8.5.1 Federal legislative programs and responsibilities related to habitat.
  - 9.8.5.2 Specific actions for the BS/A groundfish fishery.
- 9.8.6 Habitat recommendations.
  - 9.8.6.1 General techniques to address identified problems.
  - 9.8.6.2 Specific recommendations.

* * * * * *

[10.0 Other Considerations which May Affect the Fishery. 10.1 International Pacific Halibut Commission. 10.2 Marine Mammal Protection Act of 1972.]

10.3 Offshore petroleum production.
- 10.3.1 History.
- 10.3.2 Procedures.
- 10.3.3 Potential effects on fisheries.
  - 10.3.3.1 Oil and gas development.
  - 10.3.3.2 Commercial Fishing--Oil Industry Conflicts.

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[14.0 Management regime.]

14.1 Management Objectives.

E. [Add habitat objective.]

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[18.0 References.
18.1 General.]

18.2 Sources used in preparing habitat amendment.

4.0 Introduction to the Plan.

4.1 Description of the Management Unit.

4.2 Goals for Management Plan.

1. Conserve and manage the groundfish fishery resources of the Bering Sea and Aleutian Islands to assure long-term productivity, maintenance of habitat quality and quantity, and consideration for interactions with other elements of the ecosystem.

9.0 Biological and Environmental Characteristics of the Fishery.

9.8 Description of Habitat of Bering Sea/Aleutian Island Groundfish Stocks: Introduction. A fishery has been defined as a system made up of three interacting components - the aquatic habitat, the aquatic biota, and the human users of these resources (Lackey and Nielsen, 1980). However, since a fishery is most often described in terms of the product harvested (Rounsefell, 1975), productivity is likewise often exclusively described in quantitative harvest terms. The purpose of this section is to focus on the source of that productivity - that is, the environment (habitat) within which the product for harvest is generated and nurtured, the effect of man's actions on this environment, and thereby, the total productivity of the fishery.

The abundance and composition of fishery resources of a region are greatly influenced by the characteristics and quality of available habitat. The relationship between the components of a marine ecosystem can be altered by variations in physical and chemical processes, fluctuations in population dynamics, human activities, or the individual or combined interaction of any of these forces. Such alteration can affect living marine resources through changes in physical habitat, water and sediment chemistry, or the structure and function of biological communities. Among the environmental factors that limit or augment stocks are temperature, salinity, oxygen, depth, light, turbulence, currents, bottom topography, ice cover, dissolved and suspended materials, nutrients, and prey abundance, density and distribution. Temporal and spatial distribution of these factors influence their impact on stocks, but few are subject to change by man. Each fish species has its own range of limiting factors; these interact and affect survival in complex ways, usually one being more critical than others. Water pressure, light, temperature, oxygen, and nutrient elements all vary with depth, and each is vital to life in the water. Generally, other features of the water column, such as nitrogen, carbon dioxide, pH, density, and salinity, vary so little with depth that living things are not affected directly, although slight variations are important for physical reasons. Currents and upwelling carry heat, nutrients, food, eggs and larvae, and the plants and animals themselves (Royce, 1972). Species thus seek the depths, currents, and substrates most favorable to their survival. Physical conditions of sediments affect species composition of the benthos. Environmental factors combine in the Bering Sea to make it among the most productive ocean habitats in the world.

9.8.1. Description of Habitat Types. The Bering Sea covers a flat, relatively featureless shelf whose southern boundary extends from near Unimak Pass to Cape Navarin, and from a deepwater basin bounded by the shelf and the Aleutian Island Arc. The Aleutian Island Arc contains a narrow shelf that drops off rapidly to the Bering Sea on the north and the North Pacific Ocean to the south. The oceanography of this region has been summarized by Schumacher (1984).

The waters of the Bering Sea are partitioned during the summer by transition zones which separate four hydrographic domains (Figure 9.1). The hydrographic domains are distinguished by bottom depth and seasonal changes in their vertical density structure. During the winter the structure is absent or much less apparent under the ice. Beginning in the nearshore area, the coastal domain overlays waters depths less than 50 m in depth that do not stratify seasonally due to tidal mixing. The inner front, a zone of

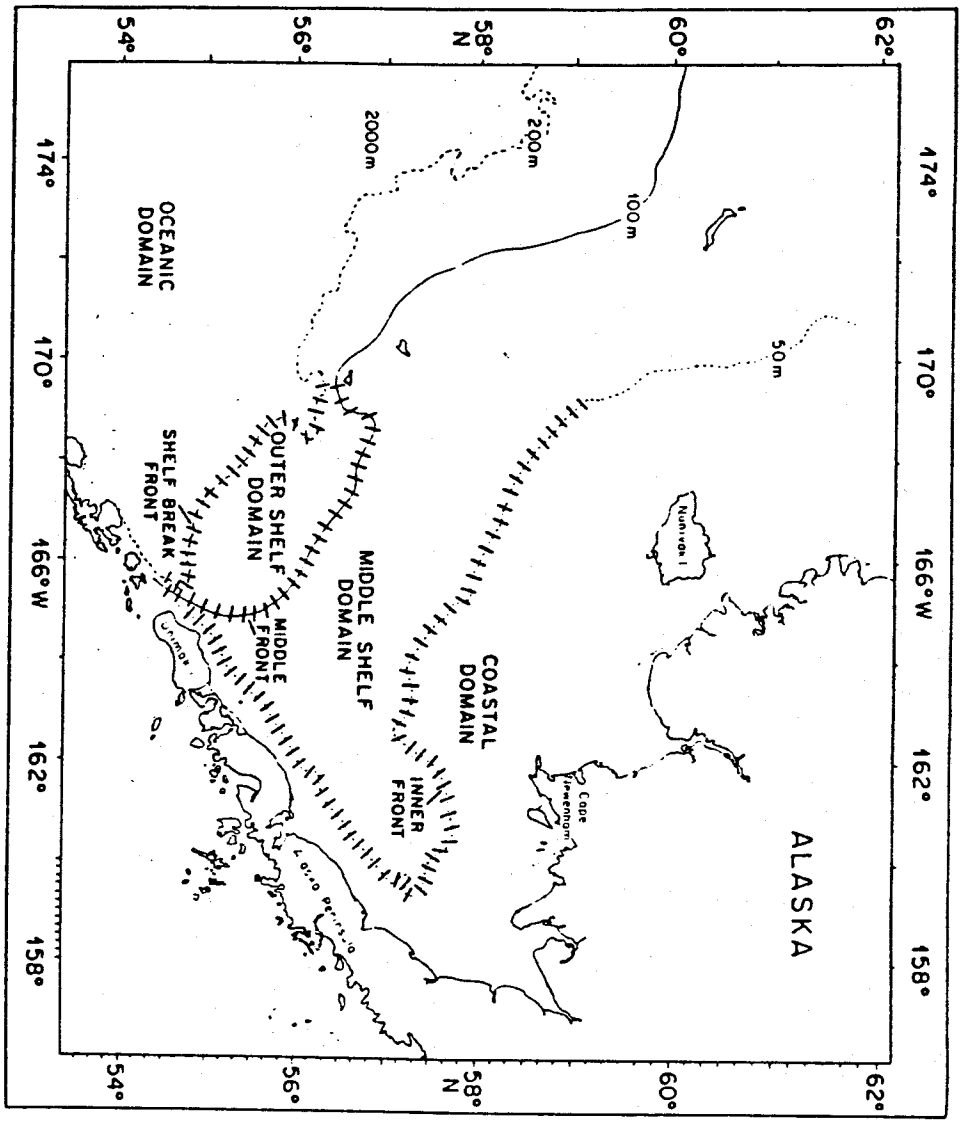
62°
60°
58° N
56°
54°
174°
170°
166° W
162°
158°
200m
100m
50m
2000m
ALASKA
Nunivak I.
Cape Newenham
OCEANIC DOMAIN
OUTER SHELF DOMAIN
MIDDLE SHELF DOMAIN
COASTAL DOMAIN
SHELF BREAK FRONT
MIDDLE FRONT
INNER FRONT
Unimak
Aleutian Peninsula

Figure 9.1

transition, separates the coastal domain from the middle shelf domain. In the middle shelf domain, over bottom depths of 50 to 100 m, seasonal stratification sets up during the ice-free season, and warmer, less saline waters overlie colder and more saline bottom waters. This stratification persists until broken down by winter cooling and storms. A broad transition zone, called the middle front, separates the middle shelf zone from the outer shelf domain. This latter domain, in water depths from 100 to 170 m, is characterized by well-mixed upper and lower layers separated by a complex intermediate layer containing fine density structure. In general, the outer shelf waters intrude shoreward near the bottom, while middle shelf waters spread seaward above them. Beyond the outer shelf domain, the shelf break front separates the shelf waters from the oceanic domain, with its more saline, less aerobic waters overlying the Bering Sea slope and deep basin.

Circulation in the Bering Sea (Figure 9.2) is generally sluggish and dominated by tidal forces. Nearshore coastal currents from the Gulf of Alaska shelf flow into the Bering Sea through Unimak Pass and then apparently continue northeastward along the Alaska Peninsula. Within Bristol Bay, the flow becomes counterclockwise and follows the 50 m depth contour toward Nunivak Island. In the middle shelf domain (water depths from 50 - 100 m), currents are weak and variable, responding temporarily as wind-driven pulses. In the outer shelf domain, a mean northwestward flow exists along the shelf edge and upper slope following depth contours.

Habitat can also be partitioned by fish species according to its life history stage and depth of occurrence in the water column. Many of the commercial species of fish lay eggs which are either pelagic fish themselves or hatch out as pelagic larvae. These weakly swimming larval stages are distributed according to their own buoyancy, vertical swimming abilities, and the currents, mixing, or water stratification on their nursery grounds. Generally, the egg and larval stages occupy the upper mixed layer of the water column, often at or near the sea surface, until they grow and develop into more actively swimming juveniles that are able to seek a preferred depth or rearing habitat. Adults of these species are typically demersal or benthic, but some of the roundfish may form schools over a wide depth-range in the water column.

With respect to the physiographic regimes and hydrographic domains of the Bering Sea, many species cross boundaries during seasonal and spawning migrations. Shelf dwellers, such as yellowfin sole and Pacific halibut spawn in deep water 275-410 m (Garrison and Miller, 1982), while walleye pollock may leave the near-bottom depths to form mid-water spawning shoals. Other species also make similar off-on shelf migrations for spawning and feeding. Adult sablefish and Pacific ocean perch live principally on the continental slope at water depths greater than 200 m but are known to make large daily vertical movements within the water column for feeding.

9.8.2 Habitat requirements. This section describes the particular habitat requirements of the different species and their life stages in the Bering Sea. The information was drawn from the following sources: Andriyashbev (1964), Bakkala and Smith (1978), Carlson and Haight (1976), Carlson and Straty (1981), Garrison and Miller (1982), Gusey (1979), Hood and Calder (1981), Lewbel (1983), Morris (1981), National Marine Fisheries Service (1979, 1980), Major and Shippen (1970), Pereyra et al (1976), and Wolotira

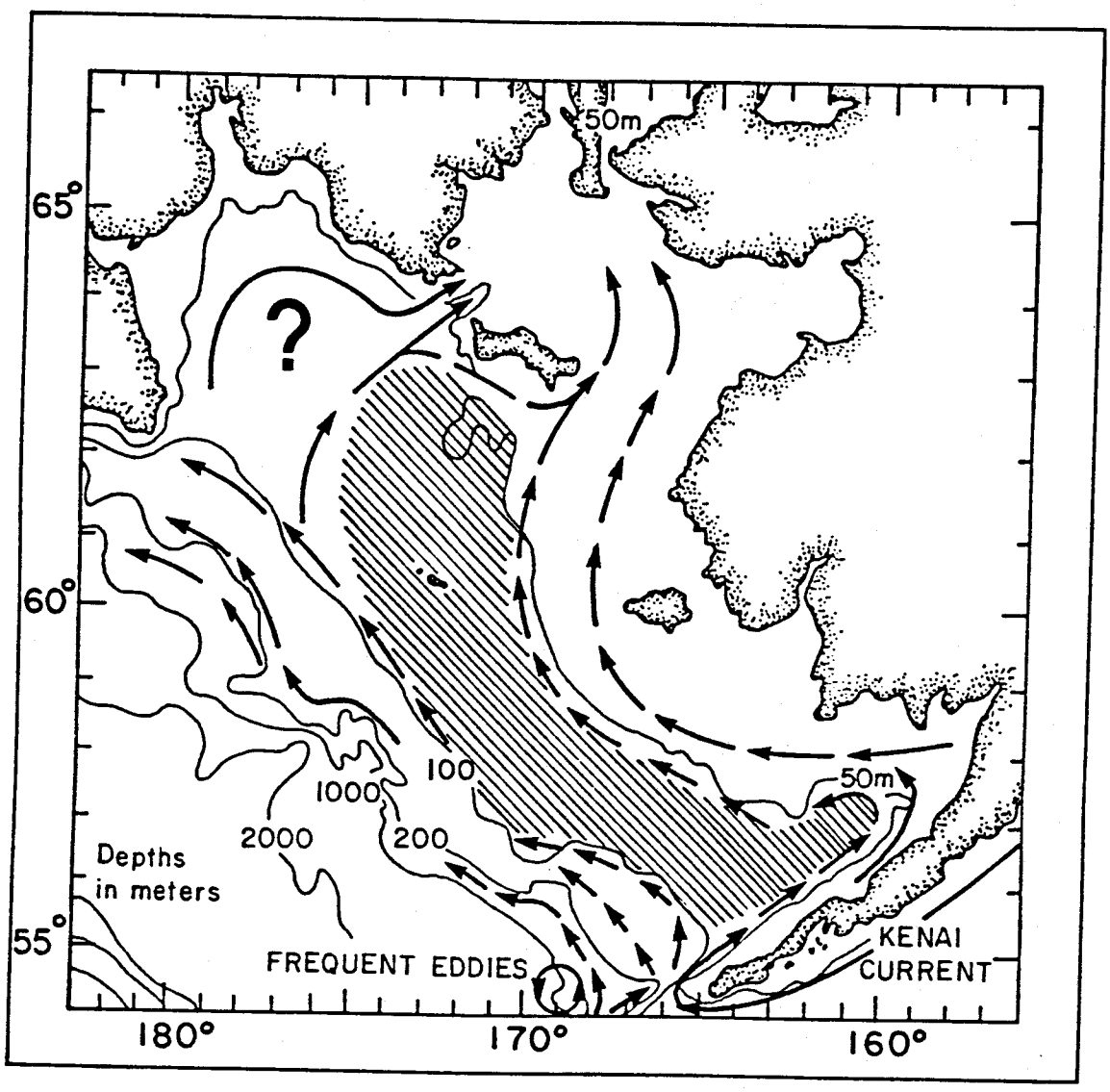
50m
65°
?
60°
100
1000
2000
200
50m
Depths
in meters
55°
FREQUENT EDDIES
KENAI
CURRENT
180°
170°
160°

Figure 9.2

(1977). See FMP sections 9.1, 9.2, and 9.5 for brief general descriptions of life history features, stock units, and ecological relationships.

9.8.2.1 Walleye pollock is the most abundant species on the continental shelf representing 20-50 percent of the total standing stock of demersal fishes. Pollock are found throughout the water column from shallow to deep water. Massive schools occur on the outer shelf and upper slope from the surface to 500 m; they are more common in depths less than 100 m. Their distribution is influenced by temperature. In the Eastern Bering Sea, walleye pollock undergo extensive seasonal migrations associated with feeding and reproduction. Overwintering takes place along the outer shelf and upper slope at 150-300 m, where bottom temperatures are relatively warmer. As temperatures on the shelf become warmer in spring, walleye pollock move to shallower waters (90-140 m) where spawning takes place. They first reproduce at the age of three or four years. Spawning occurs from March through July along the outer shelf, with major spawning concentrations occurring between the Pribilof Islands and Unimak Island. Each female produces approximately 60,000-400,000 pelagic eggs, which are abundant in waters shallower than 100 m. Walleye pollock eggs hatch in two to three weeks, depending on temperature; larvae remain in surface waters until attaining a length of 35-50 mm, then begin a demersal existence. By the end of the first year, juveniles are abundant on the shelf at the 90-110 m depth. Larval pollock begin feeding on copepod eggs and nauplii; as they grow, they feed successively on larger prey such as small copepods. Diets of adult pollock consist mainly of copepods, euphausiids, and fish (a majority of fish eaten are juvenile pollock). Walleye pollock constitute a major part of the diets of northern fur seals and other marine mammals in the Bering Sea, and are important as prey to seabirds and other fish species.

9.8.2.2 Pacific cod. This species occurs in shallower waters than walleye pollock, being generally common at depths of 80-260 m. In the Bering Sea, Pacific cod schools are most abundant on the shelf and upper slope. They undergo short seasonal migrations between the continental slope and shelf, but the timing of migrations is poorly understood. Spawning takes place from January to May, but exact timing and areas of spawning are not known. Females produce from 200,000 to 5,700,000 eggs which are benthic and initially slightly adhesive. The eggs hatch within 10-20 days and larvae are distributed at depths from 25-150 m, with the largest numbers at 75-100 m. Adults are mostly benthic and feed primarily on benthic epifauna, but they also eat planktonic crustaceans and fish. Pacific cod are utilized as food by northern fur seals, halibut, belugas, and sperm whales.

9.8.2.3 Yellowfin sole. The eastern Bering Sea contains the largest single population of this flatfish, which occurs on the shelf at depths from 5-360 m. Yellowfin sole undergo complex seasonal movements (both vertical and horizontal) that are not fully understood. During winter, adults congregate in large dense schools on the outer shelf and upper slope from 100-270 m. In spring, fish begin moving into shallower waters, and by summer the main body of the stock is found on the inner shelf at depths of less than 100 m where feeding and spawning takes place. Winter causes fish to migrate back to deeper waters. Distribution and movements of yellowfin sole are associated with environmental factors including temperature, salinity, and bottom sediment type. Adult yellowfin sole are not confined to the bottom, but make periodic vertical movements up into the water column. Spawning takes

place predominantly in June and July on the inner shelf with females releasing from one to three million pelagic eggs, which accumulate in central areas of well-developed gyres. The larvae are pelagic for four to five months before undergoing metamorphosis; at lengths of about 17 mm the juvenile sole settle to the bottom along the inner shelf. As the juveniles grow they apparently move gradually into deeper water. Their principal prey include benthic infauna and epifauna, although they also eat euphausiids, copepods and fish. Important predators on yellowfin sole include Pacific halibut and northern fur seals.

9.8.2.4 Greenland turbot. Large concentrations of greenland turbot are found in the eastern Bering Sea and Navarin Basin in a depth range of about 70-670 m. Seasonal movements by greenland turbot are complex and not fully understood. They are generally found at shallower depths in the summer than in winter. Spawning occurs from October to December in waters greater than 100 m in depth; the eggs are apparently bathypelagic, developing in deep water. After hatching, the larvae are pelagic and found in the 30-130 m depth range until they reach a length of about 80 mm when they transform and become demersal. Little else is known about the life history. Greenland turbot feed on a variety of foods including pelagic, mid-water, and demersal fishes and crustaceans.

9.8.2.5 Other flatfishes. These include rock sole, flathead sole, arrowtooth flounder, rex sole, butter sole, longhead dab, Dover sole, starry flounder, Alaska plaice, and longnose plaice.

Rock sole are most abundant in the southeastern region of the Bering Sea where they occupy areas of the shelf down to 300 m. Seasonal movements are not well-known. Spawning takes place from March to June at depths near 100 m. Eggs are adhesive and demersal, sinking to the bottom; larvae are pelagic. Adults prey on benthic invertebrates, and occasionally on fish. Predators include fish and marine mammals.

Flathead sole are most abundant in the eastern portion of the Bering Sea. They range in depth from the surface to 550 m. Seasonal distributions consist of concentrations overwintering in depths of 70-400 m on the outer shelf which then migrate to shallower waters (20-180 m) in the spring. Reproduction takes place during February to May within the shelf boundaries; eggs and larvae are pelagic and become widely distributed. The adults prey upon benthic crustaceans and echinoderms, switching to planktonic crustaceans and arrow worms while in shallow waters. Predators on flathead sole are not well-known, but are thought to be Pacific halibut and marine mammals.

Arrowtooth flounder are most abundant on the continental slope of the southeastern, central, and northwestern Bering Sea at depths of 200-500 m. Arrowtooth flounder move seasonally from the 300-500 m depth range in the winter to the 200-400 m depth range in the summer, apparently associated with water temperatures. Adults are thought to spawn from December to February, releasing up to 500,000 bathypelagic eggs. Hatched larvae remain in shallow nearshore waters over the shelf for several months; then they settle to the bottom. Juveniles gradually move into deeper waters as they grow. Major foods include crustaceans and fish. Predators on arrowtooth flounder are thought to be Pacific halibut and marine mammals.

9.8.2.6 Pacific ocean perch. The species is common in and along canyons and depressions on the upper continental slope. Two main stocks are thought to be present in the Bering Sea: an Aleutian stock, which is probably the most abundant; and an eastern slope stock along the continental slope in the eastern Bering Sea with large concentrations from the Pribilof Islands to Unimak Island. The densest concentrations occur from January to May, during spawning, west of the Pribilofs at depths of 340-420 m. During this period, the species undergoes daily vertical migrations, probably for feeding. Rockfishes give birth to live young. Because Pacific ocean perch inhabit such deep waters, tag and recapture studies are virtually impossible. Any statements about their migration patterns are therefore speculation.

Pacific ocean perch probably mate during winter (October - February) and young are born in spring (March - June). Larvae are five to eight mm at birth and live a planktonic existence for an undetermined period of time. By the end of their first year, the young fish begin a demersal existence at depths of 125-150 m. Pinnacles, rocky or gravel areas are used as nursery sites; here the juveniles remain, gradually moving deeper as they mature. The juveniles (ages one to five) feed mainly on copepods and euphausiids; adults on euphasiids, copepods, fish and squid. Pacific halibut are the main predators on Pacific ocean perch in the Bering Sea.

9.8.2.7 Other rockfishes. Rougheye rockfish, dusky rockfish, northern rockfish, shortspine thornyhead, shortraker rockfish, dark blotched rockfish, yelloweye rockfish, blue rockfish. These species are mostly demersal and distributed from the surface to very deep waters. Little is known about the biology of Bering Sea rockfishes other than Pacific ocean perch (see section 9.8.2.6 above).

9.8.2.8 Sablefish. This species occupies a wide depth range of 0-1200 m and is most abundant on the outer continental shelf and continental slope (100-600 m) where 15 to 20 percent of the total species biomass is located. Sablefish undertake extensive migrations between different areas in the North Pacific; more localized cross-shelf migrations have also been observed. Sablefish make daily vertical movements associated with feeding; fish are found higher in the water column during the day and nearer the bottom at night. Sablefish spawn during winter (February) at depths of around 550 m, where females release up to 1,000,000 pelagic eggs which rise toward the surface as they develop and hatch. Later-stage larvae are found near the surface. Little is known of egg or larval development, although one-year-old juveniles appear annually in shallow coastal waters. As pelagic juveniles mature, they move into deeper waters and become demersal. Sablefish feed on a wide variety of prey, both pelagic and benthic, depending on location, season, and age of fish. The prey include squid, capelin, pollock, and euphausiids, shrimp, pleuronectid species, cottids, and benthic invertebrates. Predators on sablefish include Pacific halibut, ling cod, and sea lions.

9.8.2.9 Atka mackerel. This species occurs in the Bering Sea from the Aleutian Islands to Cape Navarin. It is demersal during spawning, but is generally encountered in the upper water layers. Atka mackerel spawn from June to September in coastal areas with stony or rocky bottoms. The eggs are benthic and are deposited in large masses on stones or in cracks among rocks. Hatched larvae are found at depths of 2-30 m and move to the surface at night. The larvae are widely dispersed for distances of up to 200-500 miles from

shore. Adults feed largely on euphausiids. Predators on Atka mackerel are marine mammals and the larger pelagic fishes.

9.8.2.10 Squid. Several species of squid inhabit Bering Sea waters, wide ranging in distribution. The exact nature and size of the resource is poorly defined, but is generally agreed to be large and mobile. They live at mid-water and near surface depths. Spawning, for some species, may extend from spring to fall; sexual maturity may be reached in two years or less. Fertilization is internal; the fertilized eggs are released enmeshed in a gelatinous material. The number of eggs spawned per individual is low compared to groundfish. Predators on squid are marine mammals and pelagic fishes. Illex vulgaris, a common Bering Sea squid, is a typical catch species, ranging in mantle size from 22-35 cm in length. Much of the present squid catch is incidental to catches of demersal fisheries.

9.8.2.11 Pacific halibut. The distribution is widespread on the shelf and slope to depths of up to 700 m. They undertake seasonal migrations to shallow spring feeding areas, and to deeper waters (250-550 m) in the fall, where they spawn and remain in the winter. Seasonal movements can extend as far as 800 km. Spawning takes place from November through February, and females released up to two million pelagic eggs. Larvae are also pelagic until reaching a length of about ten cm after about six months; at that time they settle to the bottom to begin a benthic existence. During the pelagic life stage, eggs and larvae may be transported several hundred km by currents. Pacific halibut are long-lived and may reach ages in excess of 40 years. They are opportunistic feeders, consuming a variety of prey, which varies with age and area. Juvenile fish feed mainly on crustaceans, whereas older fish eat mostly other fish, particularly flounders. Predators of Pacific halibut are poorly known.

9.8.3 Habitat areas of particular concern. As outlined in the previous section, the groundfish resources of the Bering Sea are abundant and widely distributed. With the possible exception of the ice-covered surface layer of the shelf during winter, there is not an area, water depth, or time of year when one or several species of commercial importance are not present at some life stage. It is difficult therefore, to designate particular habitats that can be spatially and temporally defined as holding substantially more important resource values than other areas.

Adults of most of the commercially important groundfish species are known to form dense aggregations on feeding or spawning grounds at certain seasons. Most often these concentrations are found on or inside of the shelf edge in spring and early summer when and where suitable environmental conditions have formed. However, these areas shift in size and location from year to year, presumably due to a combination of environmental and population variables that are not yet well understood. For example, feeding pollock concentrations have been found to be primarily located in outer shelf waters in years when the bottom water of the middle shelf domain remained cold, but extended onto the middle shelf in warm years (Lynde, 1984).

Eggs and larvae of the groundfish species are usually more widely distributed spatially than the adults, but may be confined to a specific range of water depths. Some species such as walleye pollock lay buoyant eggs that float to the sea surface; sablefish larvae move to the surface layer during

development; other species such as Atka mackerel and rock sole lay demersal eggs that sink or adhere to the bottom.

In a general way, the following areas, among others, of the Bering Sea and Aleutians can be described as particularly rich in groundfish:

- The shelf edge from Unimak Pass northwest toward the Pribilof Islands contains abundant schools of walleye pollock and Pacific cod.

- The seabed of the middle shelf of outer Bristol Bay contains dense spawning and feeding aggregations of yellowfin sole.

- Submarine canyons along the continental slope of the Bering Sea and Aleutian Islands harbor dense concentrations of Pacific ocean perch and other rockfish species.

- Atka mackerel spawning occurs on certain restricted shelf areas with suitable (rocky) bottom characteristics, and may be particularly concentrated in the western Aleutians, such as the strait between Atka and Amlia Islands.

- Pacific herring overwinter in dense schools inside the shelf edge in the central Bering Sea. These schools are often discrete, being tens of meters thick and covering many square kilometers in area.

Significant increases in knowledge of the habitat requirements of the groundfish species are yet to be made. With this additional understanding, it may be possible to develop a finer definition of habitat areas of particular concern and a better ability to manage single and multispecies fishery resources.

9.8.4 Potential for habitat alteration. This section discusses the potential sources of pollution and habitat degradation that could affect groundfish populations in the Bering Sea and Aleutian Islands area. At present, there are no indications that any of these potential threats to the habitat have had any measurable effect on the existing habitats or stocks of groundfish, though there have been localized effects. The purpose of this discussion is to create awareness of potential problems or cumulative impacts that may occur in the future and that could be avoided.

The present primary human use of the Bering Sea/Aleutian Island area is commercial fishing. While the establishment of other activities could create user conflicts, pollution, and habitat deterioration, it is the collective opinion of NMFS and the Council that the status of the habitat in this management area is generally unimpacted by other human activities at this time. If there should be a large oil or gas discovery or surge in other development activities it may be appropriate to make a subsequent review of the habitat's status.

9.8.4.1. Oil and Gas Development. Oil and gas related activities in the Bering Sea and Aleutian area could cause pollution of habitats, loss of resources, and use conflicts. Preemption of fishing grounds because of the siting of offshore drilling rigs and platforms, loading platforms, pipelines, or an oil spill may result in the dislocation of fishing grounds, possibly a reduction in habitat quality or quantity. Some structures could increase hard substrate habitat and result in an increase in populations of some species of

rockfish. Schooling fish may also concentrate near some structures. Habitat decreases would result only from physical alteration of the habitat by construction activities, losses of productivity or resident biota, or chemical degradation from pollutants.

Pollution Risks. Oil spills are the most serious source of pollution. Offshore oil and gas development will inevitably result in some oil entering the environment. At some level, this oil can affect habitats and fish populations and has the potential to be damaging. Although many factors determine the degree and duration of damage from a spill, the most important variables are the size of the spill, the duration of the spill, and the time and geographic location of the spill. Oil is toxic to all marine organisms at some concentration. Certain species are more sensitive than others. In general, the early life stages (eggs and larvae) are most sensitive; juveniles are less sensitive, and adults least so (Rice, et al, 1984).

Habitats most sensitive to oil pollution are those with the lowest physical energy because once oiled, these areas are the slowest to repurify. Examples of low energy environments include tidal marshes and seafloor sediments. Rocky coasts and ocean surface waters are higher energy environments where physical processes will more rapidly remove or actively weather spilled oil.

A major oil spill (i.e., 50,000 bbls) would produce a surface slick covering up to several hundred square kilometers. Oil would generally be at toxic levels within this slick. Beneath and surrounding the surface slick, there would be oil-contaminated waters with lethal to sub-lethal concentrations depending on the time and distance from the surface slick. Mixing and current dispersal would act to reduce the oil concentrations with depth and distance. If the oil spill trajectory moves toward land, habitats and species could be severely affected by the loading of toxic quantities of oil into a bounded area of the nearshore environment. In the nearshore waters (i.e., Inner Domain, or Middle Domain in winter) oil could be mixed throughout the water column and contaminate the seabed sediments. Suspended sediment will also act to carry oil to the seabed. During recovery, a year class of a commercially important species of fish or shellfish could be reduced in numbers, and any fishery dependent on it would be reduced.

Toxic fractions of oil mixed to depth and under the surface slick would cause mortalities and sublethal effects to individuals and populations. However, the area contaminated would appear negligible in relation to the overall size of the area inhabited by commercial groundfish in the Bering Sea. For example, Thorsteinson and Thorsteinson (1982) calculated that a 50,000 barrel spill in the St. George Basin would impact less than 0.002 percent of the total size of this area. As a result, oil spills at sea are believed to be transitory and minor in effect on fish populations overall. But even though concentrations of oil may be sufficiently diluted not to be physically damaging to marine organisms or their consumers, it still may be detected by them, and alter certain of their behavior patterns. For instance, some animals may alter their migration routes as an avoidance response. Other exceptions are where the spill reaches nearshore areas with productive nursery grounds or areas containing high densities of fish larvae in surface waters. An oil spill at an especially important habitat (e.g., a gyre where larvae are

concentrated) could result in disproportionately high losses of the resource compared to other areas.

Other sources of potential habitat degradation and pollution from oil and gas activities include the disposal of drilling muds and cuttings to the water and seabed, disposal of drilling fluids and produced waters in the water column, and dredging materials from pipeline laying or facilities construction. These materials may contain heavy metals or other chemical compounds that will be released to the environment, but in general, the quantities are such that only local impacts can be expected to occur. Again, these activities may be of concern if they occurred in habitats of special biological importance to a resource.

Interference by Seismic Vessel Operations. Seismic vessels operate in the Bering Sea/Aleutian area for oil and gas exploration purposes. The potential exists for interference between commercial fishing vessels and seismic vessels if both are operating their gear in an area at the same time. The effect of seismic noises on groundfish is being studied off the coast of California, since concern has been expressed by fishermen that the seismic pulse has the effect of dispersing schools of fish and making them difficult to catch. Results of these studies are not yet available. There have not been many complaints by fishermen about seismic activities interfering with harvest in the Bering Sea area. If a significant problem were to develop, it might be necessary to regulate seismic operations around fishery areas.

9.8.4.2 Coastal development and filling. Minimal developmental pressure has occurred in the coastal habitat of the Bering Sea and Aleutian area. An extension of the runway into water of approximately 50-foot depth has been permitted at Unalaska but as yet is not constructed. Other projects include occasional modifications and expansions of harbors and breakwaters.

9.8.4.3 Marine mining. Of the various types of mining activities which could occur, gravel and gold mining have probably the greatest potential for development. Gravel is needed for almost all construction projects and is relatively unavailable from upland locations. Dredging for gold has been attempted at various sites along the Aleutians and off the coast near Nome. As yet no longterm or extensive dredging operations have resulted.

9.8.4.4 Derelict fragments of fishing gear and general litter. The types of fishing gear used in the groundfish fishery are trawls, and longlines - with trawls being by far the commonest. The pot fisheries for Alaska king crab and tanner crab also result in a high quantity of lost pots. Deliberate discards and accidental losses of gear can affect the groundfish and other species such as salmon, marine mammals, marine birds, and crab. Heavy polyethylene and polypropylene netting from trawl gear comprised about 80 percent of the observed litter at Amchitka Island in surveys by Merrell (1984). Derelict trawl web probably has its main impact in terms of entanglement of marine mammals and may be correlated with recent declines in populations of sea lions and fur seals. While drifting at sea, the trawl webbing floats at the surface and is probably not a threat to groundfish. The survey data collected by Merrell has shown that most of the observed litter is in small and damaged pieces of trawl webbing which were probably discarded deliberately at the time repairs were made to the trawls. A significant decline (37 percent) in the amount of debris was observed between 1974 and

1982, which may be an indication of reduced fishing effort or greater control on the part of fishermen in discarding debris. There are no specific estimates of the amounts of trawl-related gear being lost in the Bering Sea/Aleutian management area. There are estimates of the numbers of derelict crab pots, many of which may still be fishing and entrapping Pacific halibut and other groundfish (High, 1976 and 1979).

9.8.4.5 Organic discharge. Organic eutrophication may result from natural input of carbon (very high rates of primary production) or from man-induced changes such as oils or discharge from fishing vessels and processing plants. Fishing vessels and processing plants have three principal reasons for discharging organic material:

(a) dumping of prohibited species (salmon, crab, herring, and halibut) which are inadvertently caught;
(b) dumping of undesirable or untargeted catches due to lack of market, size of the fish, damaged fish, limitations in individual vessel quotas (trip limits), or individual vessel limitations such as no fish meal plant onboard;
(c) discharge of waste product and viscera from onshore and offshore processing plants. (Also varies depending on presence of fish meal plant).

Low temperatures reduce metabolic rates of microorganisms and the oxidation of carbon. Depressions containing very cold Arctic water, therefore, are conducive to development of anoxic conditions if excessive organic eutrophication occurs over a short time period and circulation is poor. In the case of poor bottom circulation and absence of scavengers to consume the material, organic material may take a long time to decompose and could become a source of contamination for the spread of bacterial and viral diseases. Development of a layer of anoxic bottom water could also adversely affect benthic organisms (Karinen, Auke Bay Laboratory, personal communication).

No real measure of the amount of discard based on reasons (b) or (c) can be made. There are statistics kept of (a), but even if they were summarized, it would be difficult to determine what impact the discard is having on the environment. Marine mammals and birds are frequently seen flocking to an area at times of discard and consuming considerable quantities of the fish or viscera; however, some portion of the discard is probably settling to the bottom. Areas of minimal circulation and flushing in the Bering Sea may warrant identification and periodic checking of the oxygen level to determine if groundfish stocks are being negatively affected. Two areas of potential concern are (1) the relatively deep canyon along the shelf edge in the middle portion of the Bering Sea and (2) the middle-domain in Bristol Bay near the Alaskan Peninsula which has several basins that are occasionally filled with very cold arctic water following periods of minimal storm activity in early spring.

Requiring full utilization of allowable catch would reduce the occurrence of discarded catches, but would create additional economic and management concerns. The relationship between amount and impact of present levels of offshore discards and incidence of diseases in demersal fish may warrant special concerns at this time. The location of any new shoreside processors should be examined for ability to assimilate organic waste.

9.8.4.6 Ocean discharge and dumping. Presently there are no major uses of the Bering Sea/Aleutian area for ocean disposals such as sewage sludge, industrial waste products, dredged materials, or radioactive waste. However, should major gold, gravel, or other onshore or offshore marine mining operations be undertaken, industrial waste permits should be reviewed to minimize heavy metal discharges.

9.8.4.7 Benthic habitat damage by bottom gear. Bottom trawls are the predominant method of fishing for groundfish in the Bering Sea/Aleutian management area with the biggest efforts being directed toward yellowfin sole and cod, and pollock by the Japanese fishermen. Midwater trawls are used to some extent which occasionally contact the bottom, but in general do not drag through the mud. The bottom type is primarily flat, even, and composed of sand and mud, considered good substrate for trawling. Even though there are no direct observations of trawl door effects in the Bering Sea, there have been experiments at the marine laboratory at Aberdeen, Scotland. In general, these experiments showed the impacts from trawl doors to be minimal (West, NWAFC, personal communication). There have also been observations in other areas with other gear. At one time, the NWAFC looked at the result of a clam dredge passing over the ocean floor with a TV video camera. The biggest disruption came from the impact of the dredge which created a two to three foot wide ditch or trench; the effect of the foot rope was minor. In the video it was observed that crabs and starfish had converged on the dredge track within fifteen minutes. The disturbed sediment had settled within thirty minutes, with the only visible trace being the ditches dug by the dredge, and crab and starfish concentrations along the ditches (Wathne, NWAFC, personal communication). A less visible impact is disturbance of demersal eggs, such as rock sole and Pacific cod, by the passage of trawls.

9.8.4.8 Contamination by heavy metals. Accumulation of heavy metals in fish indicate habitat deterioration, which may, in turn, affect marketability of the fish. The FDA's safety limit for mercury is presently 1.0 ppm of methyl mercury or about 1.1 ppm of mercury. In Hall, et al (1976) a sample of sablefish caught in the Bering Sea and in the vicinity of Kodiak Island contained very low levels of mercury (0.02 - 0.11, $\bar{x}$ 0.04 ppm). These levels do not present a problem. However, proposals which involve heavy metal discharge should be reviewed for cumulative effects.

9.8.5 Habitat protection: existing programs. This section describes (a) general legislative programs, portions of which are particularly directed or related to the protection, maintenance, or restoration of the habitat of living marine resources; and (b) specific actions taken within the Bering Sea/Aleutian Island area for the same purpose.

9.8.5.1 Federal legislative programs and responsibilities related to habitat. The Department of Commerce, through NOAA, is responsible for, or involved in, protecting living marine resources and their habitats under a number of Congressional authorities that call for varying degrees of interagency participation, consultation, or review. Those having direct effect on Council responsibilities are identified with an asterisk. A potential for further Council participation exists wherever Federal review is required or encouraged. In some cases, State agencies may share the Federal responsibility. (See Sections 9.8.3 and 9.8.5.2 for specific application to groundfish.)

* (a) Magnuson Fishery Conservation and Management Act (Magnuson Act). This Act provides for the conservation and management of U.S. fishery resources within the 200-mile fishery conservation zone, and is the primary authority for Council action. Conservation and management is defined as referring to "all of the rules, regulations, conditions, methods, and other measures which are required to rebuild, restore, or maintain, and which are useful in rebuilding, restoring, or maintaining, any fishery resource and the marine environment, and which are designed to assure that...irreversible or long-term adverse effects on fishery resources and the marine environment are avoided." Fishery resource is defined to include habitat of fish. The North Pacific Council is charged with developing FMPs, FMP amendments, and regulations for the fisheries needing conservation and management within its geographical area of authority. FMPs are developed in consideration of habitat-related problems and other factors relating to resource productivity. After approval of FMPs or FMP amendments, NMFS is charged with their implementation.

(b) Fish and Wildlife Coordination Act of 1958 (FWCA). The FWCA provides the primary expression of Federal policy for fish and wildlife habitat. It requires interagency consultation to assure that fish and wildlife are given equal consideration when a Federal or Federally-authorized project is proposed which controls, modifies, or develops the Nation's waters. For example, NMFS is a consulting resource agency in processing Department of the Army permits for dredge and fill and construction projects in navigable waters, Environmental Protection Agency (EPA) ocean dumping permits, Federal Energy Regulatory Commission hydroelectric power project proposals, and Department of the Interior (DOI) Outer Continental Shelf (OCS) mineral leasing activities, among others.

* (c) National Environmental Policy Act of 1969 (NEPA). NEPA requires that the effects of Federal activities on the environment be assessed. Its purpose is to insure that Federal officials weigh and give appropriate consideration to environmental values in policy formulation, decisionmaking and administrative actions, and that the public is provided adequate opportunity to review and comment on the major Federal actions. NEPA requires preparation of an Environmental Impact Statement (EIS) for major Federal actions that significantly affect the quality of the human environment, and consultation with the agencies having legal jurisdiction or expertise for the affected resources. NMFS reviews EISs and provides recommendations to mitigate any expected impacts to living marine resources and habitats. An EIS or environmental assessment for a finding of no significant impact is prepared for FMPs and their amendments.

(d) Clean Water Act (CWA). The purpose of the CWA, which amends the Federal Water Pollution Control Act, is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters; to eliminate the discharge of pollutants into navigable waters; and to prohibit the discharge of toxic pollutants in toxic amounts. Discharge of oil or hazardous substances into or upon navigable waters, contiguous zone and ocean is prohibited. NMFS reviews and comments on Section 404 permits for deposition of fill or dredged materials into U.S. waters, and on EPA National Pollutant Discharge Elimination System permits for point source discharges.

(e) River and Harbor Act of 1899. Section 10 of this Act prohibits the unauthorized obstruction or alteration of any navigable water of the United States, the excavation from or deposition of material in such waters, or the accomplishment of any other work affecting the course, location, condition, or capacity of such water. Authority was later extended to artificial islands and fixed structures located on the Outer Continental Shelf. The Act authorizes the Department of the Army to regulate all construction and dredge and fill activities in navigable waters to mean high water shoreline. NMFS reviews and comments on Public Notices the Corps of Engineers circulates for proposed projects.

* (f) Endangered Species Act of 1973 (ESA). The ESA provides for the conservation of endangered and threatened species of fish, wildlife, and plants. The program is administered jointly by DOI (terrestrial, freshwater, and some marine species such as walrus) and DOC (marine fish, and some marine mammals including the great whales). Federal actions that may affect an endangered or threatened species are resolved by a consultation process between the project agency and DOC or DOI, as appropriate. For actions related to FMPs, NMFS provides biological assessments and Section 7 consultations if the Federal action may affect endangered or threatened species or cause destruction or adverse modification of any designated critical habitat.

* (g) Coastal Zone Management Act of 1972 (CZMA). The principal objective of the CZMA is to encourage and assist States in developing coastal zone management programs, to coordinate State activities, and to safeguard the regional and national interests in the coastal zone. Section 307(c) requires that any Federal activity directly affecting the coastal zone of a State be consistent with that State's approved coastal zone management program to the maximum extent practicable. Under present policy, FMPs undergo consistency review. Alaska's coastal zone program contains a section on Resources and Habitats. Following a January 1984 U.S. Supreme Court ruling, the sale of OCS oil and gas leases no longer requires a consistency review; such a review is triggered at the exploratory drilling stage. (See Section 10.3.)

* (h) Marine Protection, Research and Sanctuaries Act (MPRSA). Title I of the MPRSA establishes a system to regulate dumping of all types of materials into ocean waters and to prevent or strictly limit the dumping into ocean waters of any material which would adversely affect "human health, welfare or amenities or the marine environment, ecological systems, or economic potentialities." NMFS may provide comments to EPA on proposed sites of ocean dumping if the marine environment or ecological systems may be adversely affected. Title III of the MPRSA authorizes the Secretary of Commerce (NOAA) to designate as marine sanctuaries areas of the marine environment that have been identified as having special national significance due to their resource or human-use values. The Marine Sanctuaries Amendments of 1984 amend this Title to include, as consultative agencies in determining whether the proposal meets the sanctuary designation standards, the Councils affected by the proposed designation. The Amendments also provide the Council affected with the opportunity to prepare draft regulations, consistent with the Magnuson Act national standards, for fishing within the FCZ as it may deem necessary to implement a proposed designation.

(i) Outer Continental Shelf Lands Act of 1953, as amended (OCSLA). The OCSLA authorizes the Department of Interior's Minerals Management Service

(MMS) to lease lands seaward of state marine boundaries, design and oversee environmental studies, prepare environmental impact statements, enforce special lease stipulations, and issue pipeline rights-of-way. It specifies that no exploratory drilling permit can be issued unless MMS determines that "such exploration will not be unduly harmful to aquatic life in the area, result in pollution, create hazardous or unsafe conditions, unreasonably interfere with other uses of the area, or disturb any site, structure or object of historical or archaeological significance." Drilling and production discharges related to OCS exploration and development are subject to EPA NPDES permit regulations under the CWA. Sharing responsibility for the protection of fish and wildlife resources and their habitats, NOAA/NMFS, FWS, EPA and the States act in an advisory capacity in the formulation of OCS leasing stipulations that MMS develops for conditions or resources that are believed to warrant special regulation or protection. Some of these stipulations address protection of biological resources and their habitats. Interagency Regional Biological Task Forces and Technical Working Groups have been established by MMS to offer advice on various aspects of leasing, transport, and environmental studies. NMFS is represented on both groups in Alaska.

* (j) National Fishing Enhancement Act of 1984. Title II of this Act authorizes the Secretary of Commerce (NOAA) to develop and publish a National Artificial Reef Plan in consultation with specified public agencies, including the Councils, for the purpose of enhancing fishery resources. Permits for the siting, construction, and monitoring of such reefs are to be issued by the Department of the Army under Section 10 of the River and Harbor Act, Section 404 of the Clean Water Act, or Section 4(e) of the Outer Continental Shelf Lands Act, in consultation with appropriate Federal agencies, States, local governments and other interested parties. NMFS will be included in this consultation process.

(k) Northwest Power Act of 1980 (NPA). The NPA includes extensive and unprecedented fish and wildlife provisions designed to assure equitable treatment of fish and wildlife, particularly anadromous fish, in making decisions about hydroelectric projects. Under the NPA, a detailed Fish and Wildlife Program has been established to protect, mitigate, and enhance fish and wildlife in the Columbia River Basin. In addition, general fish and wildlife criteria for hydroelectric development throughout the region have been established in the Regional Energy Plan developed under the Act. NMFS has a statutory role in the development of the Program and the Plan and encourages their implementation by Federal agencies such as the Federal Energy Regulatory Commmission, the Corps of Engineers, the Bureau of Reclamation, and the Bonneville Power Administration.

(l) Alaska National Interest Lands Conservation Act of 1980 (ANILCA). The purpose of this Act is to provide for the designation and conservation of certain public lands in Alaska. The Department of Agriculture Forest Service has authority to manage surface resources on National Forest Lands in Alaska. Under Title V of this Act, any regulations for this purpose must take into consideration existing laws and regulations to maintain the habitats, to the maximum extent feasible, of anadromous fish and other foodfish, and to maintain the present and continued productivity of such habitat when they are affected by mining activities. For example, mining operations in the vicinity of the Quartz Hill area in the Tongass National Forest must be conducted in accordance with an approved operations plan developed in consultation with

NMFS; consultation continues through the monitoring and altering of operations through an annual review of the operations plan. Title XII of the Act establishes an Alaska Land Use Council to advise Federal agencies, the State, local governments and Native Corporations with respect to land and resource uses in Alaska. NOAA is named as a member of this Council.

9.8.5.2 Specific actions for the Bering Sea/Aleutian Islands Groundfish fishery.

(a) Gear limitations that act to protect habitat or critical life stages. Section 611.16 of the foreign fishing regulations prohibit discard of fishing gear and other debris by foreign fishing vessels.

(b) Seasonal restrictions that act to protect habitat or critical life stages. Section 14.5.3 of the FMP prohibits foreign trawling year-round in the Bristol Bay Pot Sanctuary to prevent incidental catch of juvenile halibut that are known to concentrate in this area. It also restricts foreign trawling from December 1 through May 31 in the Winter Halibut Savings Area to protect winter concentrations of juvenile halibut and spawning concentrations of pollock and flounders.

(c) Other management measures that act to allow for contingencies in the condition of the stock. Sections 675.20(a)(3) and 611.93 of the Bering Sea/Aleutian Islands Groundfish regulations establish a Reserve at 15 percent of the TAC; on specified dates, that portion of this reserve which the NMFS Regional Director finds will be harvested by U.S. vessels during the remainder of the year will be allocated to DAH, with the rest allocated to TALFF. However, the Regional Director is also permitted to withhold reserves for conservation purposes.

(d) Recommendations to permitting agencies regarding lease sales. Recommendations have been made to permitting agencies on all past proposed lease sales on the Alaska OCS, in the interests of protecting or maintaining the marine environment. These recommendations have ranged from calling for delay or postponement of certain scheduled sales such as in Bristol Bay and Kodiak, requesting deletions of certain areas from sales, identifying need for additional environmental studies and for protective measures such as burial of pipelines, seasonal drilling limitations, and oilspill countermeasure planning. For example, in 1979, the Council unanimously requested an indefinite postponement of the St. George Basin lease sale, citing incomplete research results and a concern for the possibility of oil spills in an area of great economic and biologic importance. The comment was transmitted to the NMFS Central Office for transmittal to the Department of Interior. Recommendations are generally made in response to the "Call for Information," the Environmental Impact Statements, and the Proposed Notice of Sale for each lease sale. Exploration plans submitted by each oil company are also reviewed for their environmental protection provisions. In the future, assuming commercial discoveries of oil or gas, development EISs and plans will undergo a similar process for review and comment.

9.8.6 Habitat recommendations.

9.8.6.1 General techniques to address identified problems. The following is a list of "real time" possible actions or strategies the Council

may wish to take in the future, based on concerns expressed and data presented or referenced in this FMP. Actions taken must also be consistent with the goals and objectives of the FMP. Authorities for Council participation are described in section 9.8.5.1.

(a) Non-regulatory.

- Hold hearings to gather information or opinions about specific proposed projects having a potentially adverse affect on the Bering Sea/ Aleutian Island groundfish fishery.

- Write comments to regulatory agencies during project review periods to express concerns or make recommendations about issuance or denial of particular permits.

- Respond to "Calls for Information" from MMS regarding upcoming oil and gas lease areas affecting the Bering Sea/Aleutian Islands.

- Identify research needs and recommend funding for studies related to habitat issues of new or continuing concern and for which the data base is limited. Examples would include research to identify critical habitats or to determine the long-term effect of various levels and types of toxicity on marine fish and their food webs in the Bering Sea/Aleutian Islands region. Other examples: underwater TV observations of trawl impacts, and investigations as to how to modify gear to reduce these impacts.

- Establish review panels or an ad hoc task force to coordinate or screen habitat issues.

- Propose to other regulatory agencies additional restrictions on industries operating in the fisheries management area, for purposes of protecting the fisheries or habitat against loss or degradation. Examples are waste discharge restrictions for floating processors, or drilling restrictions for oil and gas exploration.

- Join as amicus in litigation brought in furtherance of critical habitat conservation, consistent with FMP goals and objectives.

(b) Regulatory. An FMP may contain only those conservation and management measures which pertain to fishing or to fishing vessels.

- Propose regulations establishing gear, timing, or area restrictions for purposes of protecting particular habitats or life stages of species in the Bering Sea/Aleutian Island groundfish fishery. An example would be the winter halibut savings area designed to protect juvenile Pacific halibut concentrations during the winter months.

- Propose regulations establishing area or timing restrictions to prevent the harvest of low-quality fish in contaminated areas, in the interests of public health and safety. An example would be that if fish taken at or near dumpsites or areas of concentrated discharge were shown to be harmful to human health or to be less valuable commercially or nutritionally, an area closure could be established.

- Propose regulations restricting disposal of fishing gear by domestic vessels.

9.8.6.2 Specific recommendations. The following section summarizes Council policy regarding the habitat issues contained in the Bering Sea and Aleutian Island FMP.

(a) Recommendation re further research. Research needs related to maintaining the productive capacity of fish habitat can be broadly classified as those which (a) examine the direct affects of man's activities (such as fishing, oil exploration, or coastal development), and (b) apply fisheries oceanography in an ecosystem context (such as migration and transport patterns, predator/prey relationships, life histories). Both categories of research serve to increase the ability to perceive and measure change caused by externalities, whether man-made or natural. The following represents areas that are potential cause for concern, and where extra precaution should be taken.

Under category (a), further observations should be made and maintained on the short and long-term effects of habitat alteration caused by fishing and oil exploration in the Bering Sea/Aleutian Island groundfish management area. These include derelict fragments of fishing gear, organic eutrophication from discarded catches, incidence and transmission of disease, benthic habitat damage by fishing gear, the recovery rate of oil-polluted environments, and long-term cumulative effects of discharged and spilled oil.

Under category (b), expanded research is needed on factors affecting the ecosystem such as currents, temperatures, geologic structures, and the influence of ice on biological and physical events. More information about life histories, food chains, and predator/prey relationships is needed for a clearer understanding of an organism's response to perturbations in the habitat.

(b) Recommendations re oil activity.

- Second offering lease sales that are scheduled at two year intervals in the Bering Sea (for example, in the St. George or Navarin Basins) should be reviewed to determine whether delays might be called for. Such delays might allow time for the oil industry to gain experience in these areas, to learn from mistakes that may be made and could avoid being repeated, and to allow the oil and fishing industries to evolve a mutual understanding and cooperative working relationship with each other. Accelerating the pace of leasing can unnecessarily compound conflicts and competition and deter their resolution. These sales are scheduled at a time of an expanding domestic fishing industry which could reach full utilization capacity in the EEZ.

- Because the southern Bering Sea area contains the greatest abundance of harvestable groundfish species, as well as the most productive king and Tanner crab grounds in the U.S. sector of the Bering Sea, oil leasing on the productive fishing areas should be examined to determine whether it should be deferred. Oil spills and fishing conflicts are paramount concerns. Damage to this productive habitat could have long-lasting consequences to the fisheries. The fishing industry desires to learn from their experiences with the oil industry in the other Bering Sea lease areas (i.e., the St. George and Navarin

Basins) before oil drilling is authorized in this single most productive area of offshore Alaska.

10.0 Other Considerations which May Affect the Fishery.

10.3. Offshore Petroleum Production. Material here and at section 9.8.4.1 is drawn from Berg (1977); Deis et al (1983); OCSEAP Synthesis Reports on the St. George Basin (1982), the Navarin Basin (1984), and the North Aleutian Shelf (1984); Thorsteinson and Thorsteinson (1982); and the University of Aberdeen (1978).

10.3.1 History. The first Federal lease sale on the Alaska offshore area was held in April 1976 in the northern Gulf of Alaska. Since then, there have been nine other lease sales. No development or production activities have taken place. The Alaska offshore area comprises 74 percent of the total area of the U.S. continental shelf. Because of its size, the Alaska OCS is divided into 3 subregions--Arctic, Bering Sea, and Gulf of Alaska. The Bering Sea/Aleutian Subregion contains five planning areas where lease sales have been held or are currently scheduled - Norton Basin, St. George Basin, Navarin Basin, North Aleutian Basin, and Shumagin (Figure 9.3). Other planning areas identified on this map are not currently scheduled for leasing.

The final 5-year OCS oil and gas leasing schedule was approved by the Secretary of the Interior on July 21, 1982. Adjustments in the sale schedule are regularly made, the most recent being October 24, 1984. Three lease sales have been held in the Bering Sea Subregion. Six other lease offerings are scheduled in this region through 1987 (see section 10.3.3). The Secretary of the Interior is required to maintain an oil and gas leasing program that "consists of a schedule of proposed lease sales indicating, as precisely as possible, the size, timing, and location of leasing activity" that will best meet national energy needs for a 5-year period following its approval or reapproval. In developing the schedule, the Secretary is required to take into account the potential impacts of oil and gas exploration on other offshore resources, including the marine, coastal, and human environments.

10.3.2 Procedures. Once a lease is awarded, before exploratory drilling can begin in any location, the lessee must submit an exploration plan to the Minerals Management Service for approval. An oilspill contingency plan must be contained within the exploration plan. If approved by MMS and having obtained other necessary permits, the lessee may conduct exploratory drilling and testing in keeping with lease sale stipulations and MMS Operating Orders.

If discoveries are made, before development and production can begin in a frontier lease area, a development plan must be submitted and a second EIS process begun. At this time, a somewhat better understanding of the location, magnitude, and nature of activity can be expected, and resource concerns may once again be addressed before development can be permitted to proceed.

If an oilfield is discovered, the decision to produce it depends on a number of factors, including the oilfield's size, depth, and formation conditions; drilling water depth; environmental constraints; distance to onshore facilities; regulatory constraints; and the projected price of oil. If a commercial quantity of petroleum is found in the Bering Sea, the effort would require construction of a production facility and all the necessary infrastructure for either pipelines to onshore storage and shipment terminals or to build offshore loading facilities.

10.3.3 Potential effects on fisheries.

10.3.3.1 Oil and gas development. See section 9.8.4.1 which describes pollution risks and interference by seismic vessel operations.

10.3.3.2 Commercial Fishing - Oil Industry Conflicts. Although the fishing industry is presently the major user of the Bering Sea, with the growth of petroleum industry activities in this area it is likely that conflicts will arise between the two industries. In addition to oil spills, there are several points of potential use conflicts that could affect the fishing industry, even without affecting the resource itself. These potential sources of conflict include preemption of fishing space, gear damage, contamination of catch, and competition for port facilities and supplies.

Loss of fishing grounds. Siting of offshore facilities, pipelines, safety zones and transportation corridors, and at least temporarily, a major oil spill could preempt fishing grounds. The extent of loss will depend on the number and locations of structures and the sizes of the safety zones required. These losses could persist throughout the life of the field (up to 25 years). In the North Sea, a loss of 0.79 sq. km is associated with each platform.

Damage to fishing gear. Seabed installations, unburied pipelines, mooring chains and anchors, or discarded debris could snag lines and trawls and cause damage or gear loss. Vessel traffic could entangle crab pots and line sets or their marker buoys. Avoidance of fishing gear sets will be hampered by frequent low visibility conditions of the area. An oil spill could contaminate gear.

Contamination of catch. Oil-fouled gear could contaminate the catch and render it unmarketable. Oil-contaminated water could affect at-sea processors or live-holds of crabbers. Perceived tainting by the public as the result of publicity about a major oil spill could reduce product demand, price, or market for the fisherman.

Competition for facilities and supplies. Unalaska/Dutch Harbor is identified as the major oil industry support/supply base for the southern Bering Sea/Aleutian lease areas. It is also the major fishing port in Alaska. Limited availability of space and supplies will increase competition for them, and could inflate the prices for space, services, and goods between the fishing and petroleum industries.

14.0 Management Regime.

14.1 Management Objectives.

E. Seek to maintain the productive capacity of the habitat required to support the Bering Sea/Aleutian Island groundfish fishery.

18.0 References.

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REGULATORY IMPACT REVIEW/INITIAL REGULATORY FLEXIBILITY ANALYSIS
FOR AMENDMENT 9 TO THE
FISHERY MANAGEMENT PLAN
FOR THE GROUNDFISH FISHERY OF THE BERING SEA AND ALEUTIAN ISLANDS AREA

ADOPTED BY THE
NORTH PACIFIC FISHERY MANAGEMENT COUNCIL
FOR PUBLIC REVIEW

PREPARED BY THE PLAN TEAM FOR THE GROUNDFISH FISHERY
OF THE BERING SEA AND ALEUTIAN ISLANDS AREA

April 1985

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I. INTRODUCTION

The Administration's policy on the development and issuance of regulations is established by Executive Order 12291. The main objectives of that policy are to reduce the burdens imposed by existing and future regulations, to increase agency accountability for regulatory actions, and to provide for Presidential oversight of the regulatory process, minimize duplication and conflict of regulations, and inusre well-reasoned regulations. Under these guidelines each agency, to the extent permitted by law, is expected to comply with the following requirements:

1. Administrative decisions shall be based on adequate information concerning the need for and consequences of proposed government action.

2. Regulatory action shall not be undertaken unless the potential benefits to society from the regulation outweigh the potential costs to society.

3. Regulatory objectives shall be chosen to maximize the net benefits to society.

4. Among alternative approaches to any given regulatory objective, the alternative involving the least net cost to society shall be chosen; and

5. Agencies shall set regulatory priorities with the aim of maximizing the aggregate net benefit to society, taking into account the condition of the particular industries affected by regulations, the condition of the national economy, and other regulatory actions contemplated for the future.

In compliance with Executive Order 12291, the National Marine Fisheries Service (NMFS) requires the preparation of a Regulatory Impact Review (RIR) for all regulatory actions which either implement a new fishery management plan (FMP) or significantly amend an existing FMP, or may be significant in that they affect important DOC/NOAA policy concerns and are the object of public interest. The RIR: 1) provides a comprehensive review of the level and incidence of impact associated with the proposed or final regulatory actions; 2) provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve the problems; and 3) ensures that the regulatory agency or council systematically and comprehensively considers all available alternatives so that the public welfare can be enhanced in the most efficient and cost effective way.

The RIR also serves as the basis for determining whether the proposed regulations implementing the FMP or amendment are "major" under criteria provided in Executive Order 12291 (described above), whether or not the proposed regulations will have a "significant economic impact on a substantial number of small entities" under the Regulary Flexibility Act (P.L. 96-354), and whether or not the Paperwork Reduction Act of 1980 (P.L. 96-511) applies. The primary purpose of the Regulatory Flexibility Act is to relieve small businesses, small organizations and small governmental jurisdictions

(collectively, "small entities") from burdensome regulatory and recordkeeping requirements. This Act requires that if regulatory and recordkeeping requirements are not burdensome then the head of an agency must certify that the requirement, if promulgated, will not have a significant economic effect on a substantial number of small entities.

The purpose of the Paperwork Reduction Act, in part, is to minimize the federal paperwork burden for individuals, small businesses, state and local governments and other persons. This Act requires each agency to ensure its information systems do not overlap each other or duplicate the systems of other agencies.

This RIR analyzes the impacts of five rules proposed by the North Pacific Fishery Management Council (Council) for amending the Fishery Management Plan for Groundfish in the Bering Sea/Aleutian Islands (FMP):

1. The first rule would raise the upper end of the Optimum Yield (OY) range from 2.0 to 2.5 million metric tons (mt). This would allow the Council greater flexibility to set higher Total Allowable Catches (TACs) in the future in response to improvements in stock condition should the bio-socio-economic situation warrant.

2. The second rule addresses the problem of increasing incidental catches of chum salmon by joint venture fisheries.

3. The third rule would close an area within 20 miles of the Aleutians to all foreign trawling in order to reduce the incidental catches of fully utilized species.

4. The fourth rule would require domestic catcher/processors to submit weekly catch reports to provide for timely in-season catch reporting by management area to reduce the risk of under- or over-harvest.

5. The fifth rule would implement the NMFS Habitat Preservation Policy.

II. BACKGROUND

In 1977, under authority of the Magnuson Fishery Conservation and Management Act (Magnuson Act), the Secretary of Commerce assumed management jurisdiction over foreign fishing for Bering Sea and Aleutian Islands area groundfish in the 3 - 200 mile Fishery Conservation Zone (FCZ) by promulgating the Trawl Fisheries and Herring Gillnet Fisheries of the Eastern Bering Sea and Northeast Pacific Preliminary Management Plan (PMP). The PMP was published in the Federal Register (43 FR 9298) on February 15, 1977, and implemented March 1, 1977. It regulated foreign fishing through 1981. The North Pacific Fishery Management Council (Council) developed a Fishery Management Plan for the Groundfish Fishery of the Bering Sea and Aleutian Island Area (FMP) and submitted it in 1979 to the Assistant Administrator for approval and

implementation under the Magnuson Act. The FMP and its implementing regulations became effective on January 1, 1982 (46 FR 63295) and govern fishing for groundfish by United States and foreign vessels in the FCZ of the Bering Sea and that part of the North Pacific Ocean adjacent to Alaska west of 170° west longitude. The FMP has been amended several times, although not all recommendations made by the Council have been approved and implemented.

Prior to 1984, the Council would receive amendment proposals during any of its scheduled meetings. At its April, 1984 meeting, the Council adopted a policy whereby proposals for amendments would be received only once a year. Proposals contained in Amendment 10 were requested by the Council in September 1984 with a deadline set at December 7, 1984. The Council then instructed its Plan Team to review and rank each proposal that was received. At its February 1985 meeting, the Council reviewed the recommendations of the Plan Team, Scientific and Statistical Committee, and Advisory Panel, and selected six proposals for inclusion in Amendment 10. Other proposals were identified for development and consideration in a future amendment. At the March meeting the Council deleted one of these proposals.

The five topics to be reviewed in this environmental assessment are: (1) increase the upper end of the optimum yield (OY) range to 2.5 million metric tons; (2) Reduce the incidental catch of chum salmon (Oncorhynchus keta) by joint venture trawlers; (3) Establish measures to reduce the incidental bycatch of fully utilized domestic species by foreign trawlers in the Aleutian Islands; (4) Establish a reporting system for catcher/processor vessels; and (5) Implement the NMFS habitat policy. Each of these topics will be presented as chapters of this document.

III. RULE 1: Increase the upper end of the OY range to 2.5 million mt.

The objective of this proposal is to provide for greater management flexibility necessary to more fully utilize groundfish resources in amounts consistent with increases in biomass surplus production. Amendment 1 to the FMP established a single optimum yield (OY) for the groundfish complex in the Bering Sea/Aleutians equal to a range of 1.4 - 2.0 million mt. The complex has 10 commercial species or species groups of groundfish. The OY is equal to the sum of the Total Allowable Catch (TAC) for each species. Each year the Council determines the TAC for each species using the best available information concerning the acceptable biological catch or equilibrium yield (EY) for each species and also socioeconomic data. The sum of the TACs cannot exceed or be less than the OY without amending the FMP, a process that requires about one year.

The maximum sustainable yield for the groundfish complex is estimated to be 1.7-2.4 million mt. This amount is equal to the sum of the MSYs for the major individual species groups. Ecosystem models, however, indicate that the MSY may exceed 2.4 million mt. These models simulate the dynamics of the principal components of the Bering Sea/Aleutian ecosystem and indicate that the minimum exploitable groundfish biomass may be at least 9.5 million mt. This amount should be capable of sustaining exploition above 25 percent or more than 2.4 million mt.

When Amendment 1 was developed and implemented, the sum of EYs was below the upper end of the OY range. Recruitment of several strong year classes of

groundfish has enhanced the condition of several stocks, which have thus increased in biomass. As a result EYs have increased steadily from 1.5 million mt in 1977 to a peak of 2.2 million mt in 1984. The current upper limit on the OY has constrained the Council during some years from setting a total TAC at a level that would allow for fuller utilization of surplus production. This constraint has occurred during the last three years - 1983, 1984, and 1985 when the EY exceeded 2.0 million mt for each year. Although the sum of EYs has declined slightly in 1985 and certain other factors indicate that the sum of EYs may decline in the near future, the sum of EYs is expected to exceed 2.0 million mt in future years as a result of conservation and management measures now made possible under the Magnuson Act. An increase in the upper end of the OY range would provide the Council and the Secretary of Commerce broader latitude to more fully utilize the groundfish resources.

The major impact anticipated as a result of this Rule is to enable management to be more responsive to changing market conditions in situations where resource strength will allow it. To the extent that foreign fishing might be allowed to increase above 2.0 million mt, foreign fees would increase. The amount of increase would be dependent on the species composition of the additional harvest and the current fee schedule. As American fishermen replace foreigners in the future they could also utilize the additional OY. Again, the value of this additional OY would depend on species composition. Assuming that it would all be lowest value fish such as pollock, with an ex-vessel (U.S.) price of about $97 per metric ton, the expected value of a 500,000 mt increase would be approximately $48.5 million. However, since it is unlikely that harvests would reach or be maintained at this level, this value is probably near the maximum and would seldom or never be achieved. This proposed rule is discussed in greater detail in the Environmental Assessment for this amendment.

IV. RULE 2: Reduce the incidental catch of chum salmon by joint venture trawlers.

A. PROBLEM NECESSITATING THE PROPOSED RULE

U.S. joint venture operations, i.e. U.S. fishing vessels delivering their catch to foreign processing vessels, have expanded dramatically in the Bering Sea and Aleutian Islands since their introduction to the area in 1980 (Table 1). The total all species harvest increased by more than ten-fold from 1980 to 1984 and is expected to nearly double again in 1985. The majority of this increase has been in pollock joint ventures in the Bering Sea, which increased from 10,600 mt in 1980 to 149,000 mt in 1983. Preliminary data indicate the harvest reached over 235,000 mt in 1984, and in 1985 it is expected to reach over 390,000 mt.

This rapid development of the U.S. fishing industry, while very profitable to those involved, has led to increased catches of species which are prohibited to both foreign and domestic trawl vessels. The FMP and current groundfish regulations state that "The operator of each vessel shall minimize its catch of prohibited species." All species of salmonids, including chum salmon, are considered prohibited species and must be returned to the sea with a minimum of injury. Foreign nations are given a salmon prohibited species catch (PSC) limit which equals the total salmon PSC multiplied by the ratio of the nation's groundfish allocation divided by the total TALFF plus reserves. Once

Table 1.--Estimated catches of groundfish (1,000s t) taken by the foreign and joint-venture fisheries in the Bering Sea/Aleutian region 1977-84.[a]

Fisheries/ species group	1977	1978	1979	1980	1981	1982	1983	1984[b]
FOREIGN DIRECTED FISHERY								
TOTAL	1,288.7	1,383.3	1,288.3	1,295.0	1,273.0	1,188.1	1,125.2	1,193.1
Pollock	978.4	977.7	944.0	1,006.1	986.9	959.9	891.5	
Pacific cod	35.9	46.8	41.4	37.3	39.1	28.2	41.5	
Sablefish	4.6	2.0	2.2	2.4	3.0	3.8	3.2	
Atka mackerel	NA	24.2	23.3	20.2	18.0	7.4	1.2	
Rockfish	10.8	7.5	7.2	8.5	7.3	4.9	2.0	
Yellowfin sole	47.3	140.9	101.1	77.8	81.2	76.0	85.9	
Turbots and other flatfishes	89.3	94.9	89.9	88.5	91.9	79.3	80.3	
Pacific herring	19.3	8.4	7.5	0.8	0.3	1.9	1.4	
Other fish	94.7	71.5	64.7	47.0	39.4	22.3	14.3	
Squid	8.4	9.4	7.0	6.4	5.9	5.0	4.0	
JOINT-VENTURE FISHERY								
TOTAL				32.7	78.5	108.6	211.2	361.8
Pollock				10.6	42.1	54.6	149.0	
Pacific cod				8.4	9.2	13.6	14.4	
Sablefish				<0.1	0.2	0.1	0.1	
Atka mackerel				0.3	1.6	12.5	10.5	
Rockfish				0.1	<0.1	<0.1	0.1	
Yellowfin sole				9.6	16.0	17.4	22.5	
Turbots and other flatfishes				2.8	6.0	9.2	11.7	
Pacific herring				0.1	0.0	<0.1	1.1	
Other fish				0.7	3.4	1.1	1.6	
Squid				0.0	<0.1	<0.1	<0.1	

[a] Statistics for 1977-83 from Berger et al, 1984
[b] Preliminary

Table 2.--Estimated incidental catches (Nos. and t) of salmon (Oncorhynchus spp.) in the foreign and joint-venture groundfish fishery in the Bering Sea/Aleutian Island region, 1977-84.

Year	Total		Foreign		Joint-venture	
	(Nos.)	(t)	(Nos.)	(t)	(Nos.)	(t)
1977	47,840	198	47,840	198	NF	NF
1978	44,548	137	44,548	137	NF	NF
1979	107,706	340	107,706	340	NF	NF
1980	122,002	388	120,104	381	1,898	7
1981	43,191	140	42,337	137	854	3
1982	23,623	92	21,241	85	2,382	8
1983	42,666	120	18,173	66	24,493	54
1984 (Jan.-Nov.)	73,200		12,800		60,573	

NF = no fishing

More than 97 percent of salmon in joint-venture fisheries were chum salmon in 1983 and 1984.

Table 3.--Estimated incidental catches (Nos. and t) of chum salmon (Oncorhynchus keta) in the foreign and joint-venture groundfish fishery in the Bering Sea/Aleutian Island regon, 1977-84.

Year	Total			Foreign			Joint-venture		
	(Nos.)	%	(t)	(Nos.)	%	(t)	(Nos.)	%	(t)
1977	4,306	9		4,306	9		NF		
1978	4,811	10.8		4,811	10.8		NF		
1979	6,139	5.7		6,139	5.7		NF		
1980	6,726	5.6		6,726	5.6		0	0	0
1981	6,184	14.32	18.12	5,800	13.7	17.02	384	45.0	1.10
1982	7,697	32.58	25.30	7,116	33.5	23.91	581	24.4	1.39
1983	32,141	75.33	75.14	8,201	45.09	22.47	23,940	97.74	52.67
1984[a]	73,200			12,800			60,400		

[a] Preliminary through November 1984.
NF = no fishing.

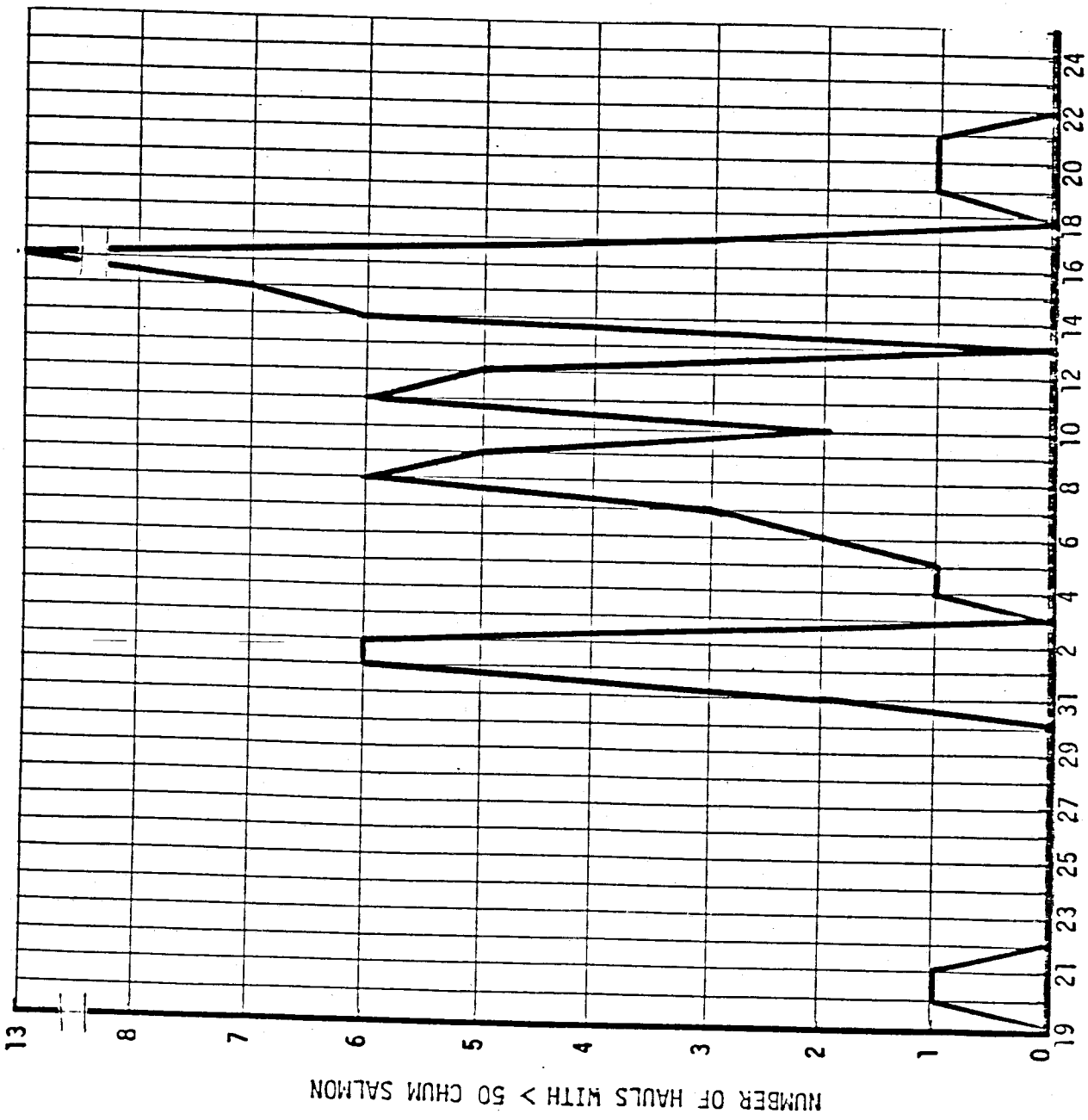

Figure 1 Number of hauls with greater than 50 chum salmon by daily periods, July-August 1984

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Table 4.--Estimated numbers of salmon and tonnage of groundfish landed in the Bering Sea/Aleutian region joint-venture fishery in 1984 by month and management area.

Month	Estimated Numbers of Salmon				Total Groundfish Catch			
	Total (Nos.)	1 (Nos.)	2 (Nos.)	4 (Nos.)	Total (t)	1 (t)	2 (t)	4 (t)
Jan.	3	3	-	-	269.9	269.9	-	-
Feb.	53	53	-	-	4,830.6	4,830.6	-	-
Mar.	427	427	-	-	40,437.6	40,437.6	-	-
Apr.	808	798	-	10	53,472.9	51,108.9	-	2,364.0
May	15	1	0	14	20,598.8	8,406.6	52.9	12,139.3
Jun.	228	147	0	81	57,354.1	39,997.2	2,145.7	15,211.2
Jul.	1,523	1,419	91	13	89,521.3	41,258.9	34,536.3	13,726.1
Aug.	57,008	56,909	71	28	70,991.5	54,849.4	8,073.7	8,068.4
Sep.	494	491	-	3	23,048.5	22,410.8	-	637.7
Oct.	14	14	-	-	1,197.5	1,197.5	-	-
Nov.	0	0	-	-	45.0	45.0	-	-
Dec.	-	-	-	-	-	-	-	-
Total	60,573	60,262	162	149	361,767.7	264,812.4	44,808.6	52,146.7

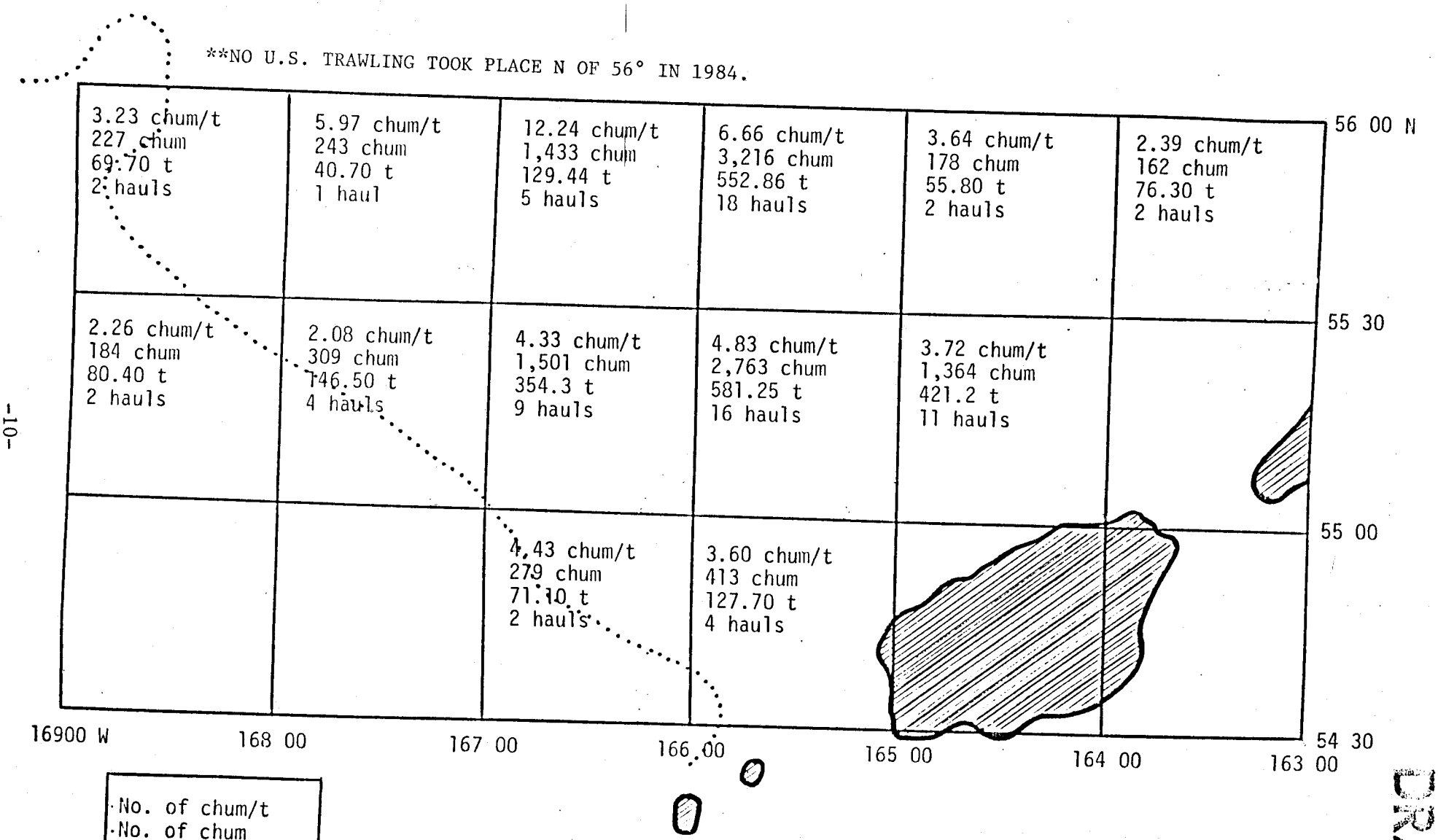

Figure 2. Catch rate and amount of chum salmon in joint-venture fisheries by statistical blocks, July-August 1984. Only hauls with more than 50 chum salmon were included.

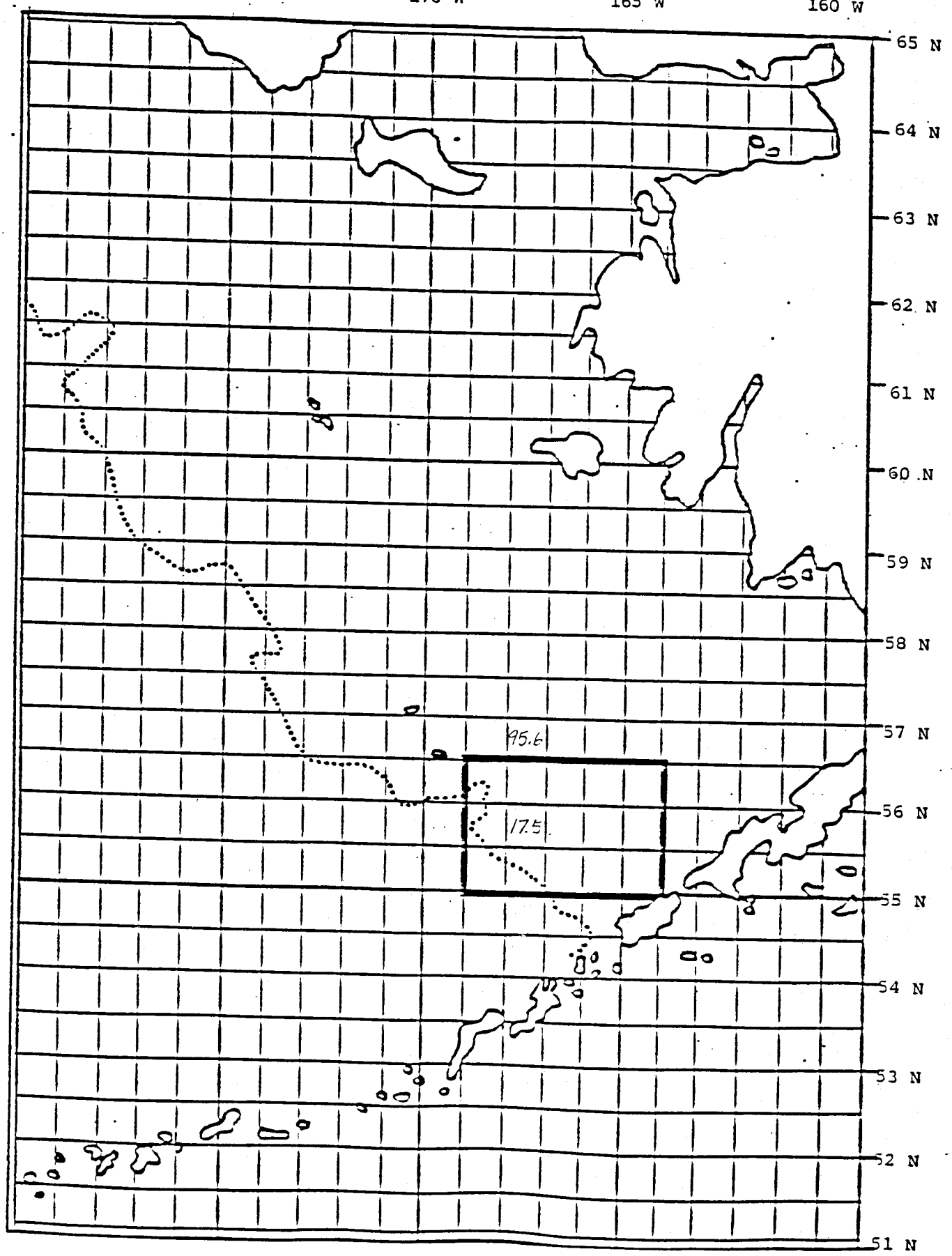

Figure 3. Pollock CPUE (mean t/day) for Japanese surimi trawlers by statistical blocks, June 1982.

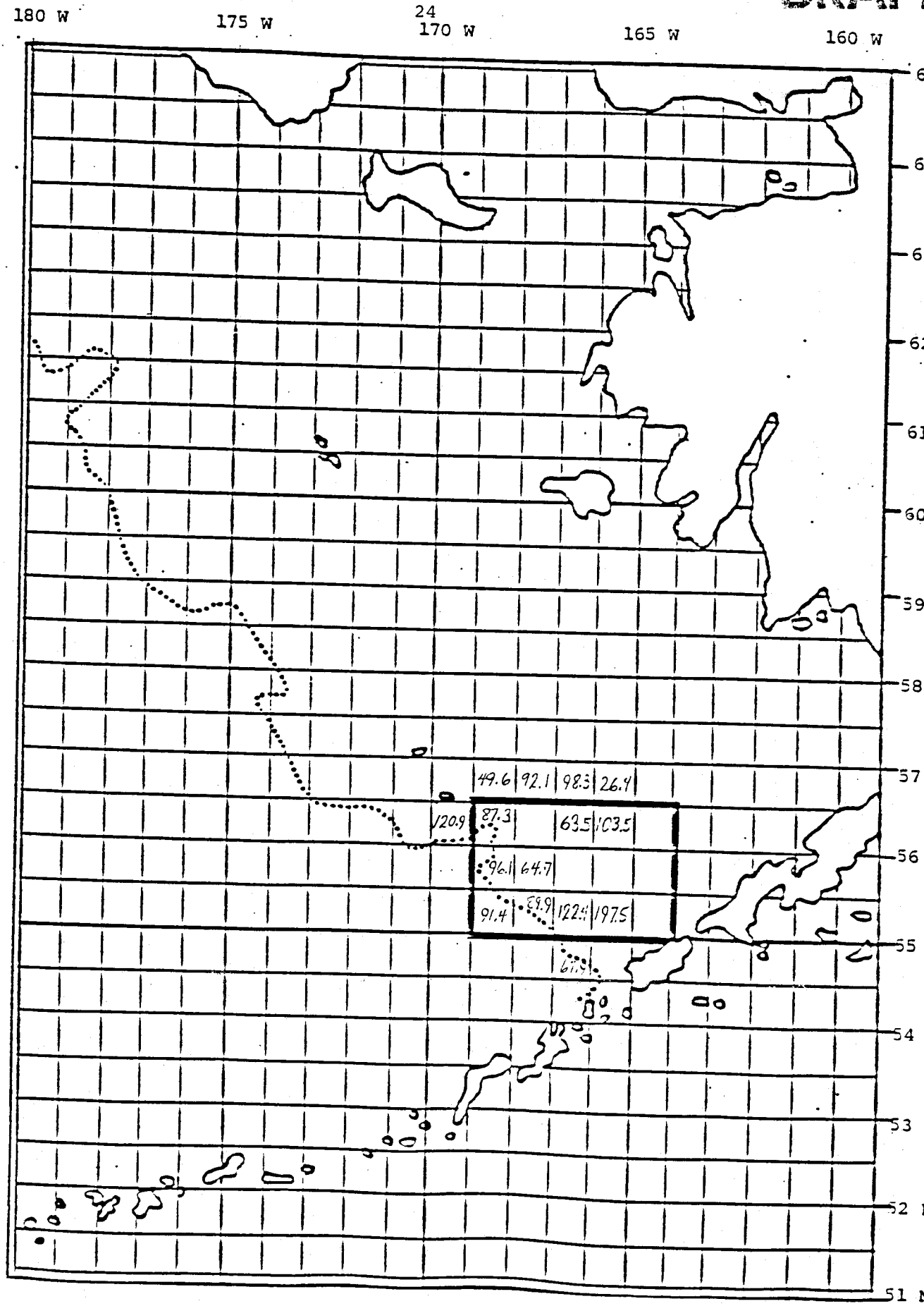

Figure 4. Pollock CPUE (mean t/day) for Japanese surimi trawlers by statistical blocks, July 1982.

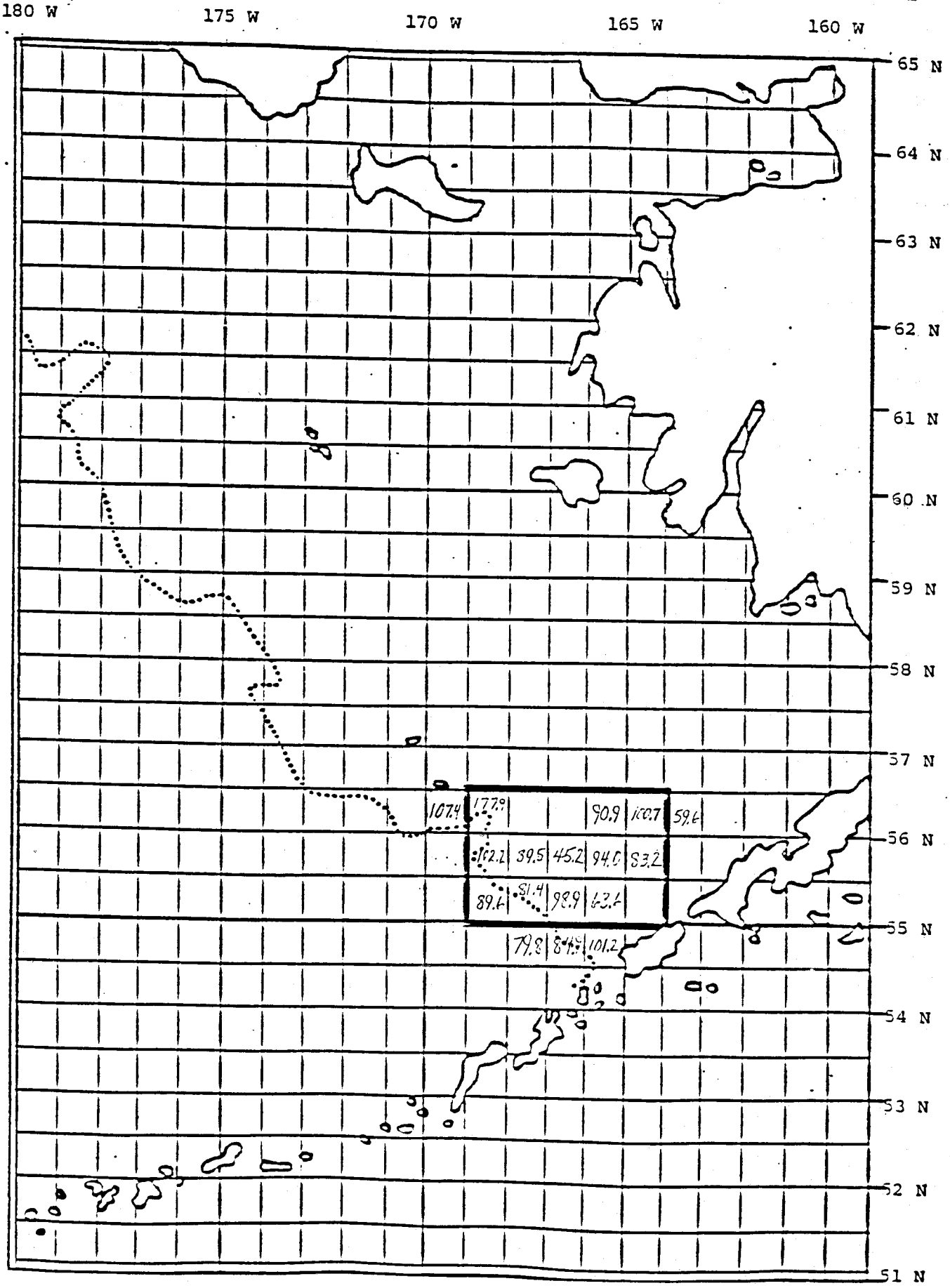

Figure 5. Pollock CPUE (mean t/day) for Japanese surimi trawlers by statistical blocks, August 1982.

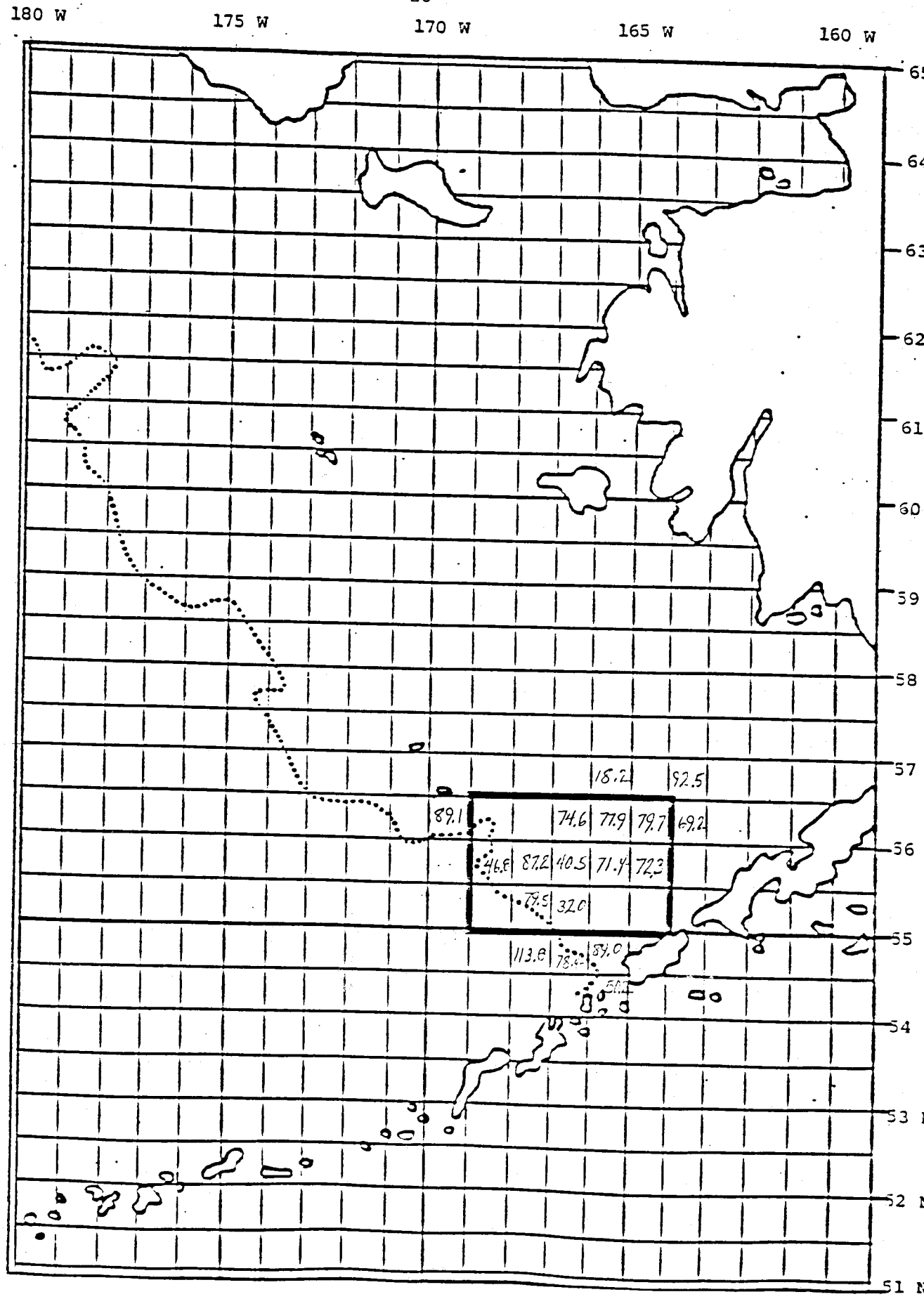

Figure 6. Pollock CPUE (mean t/day) for Japanese surimi trawlers by statistical blocks, September 1982.

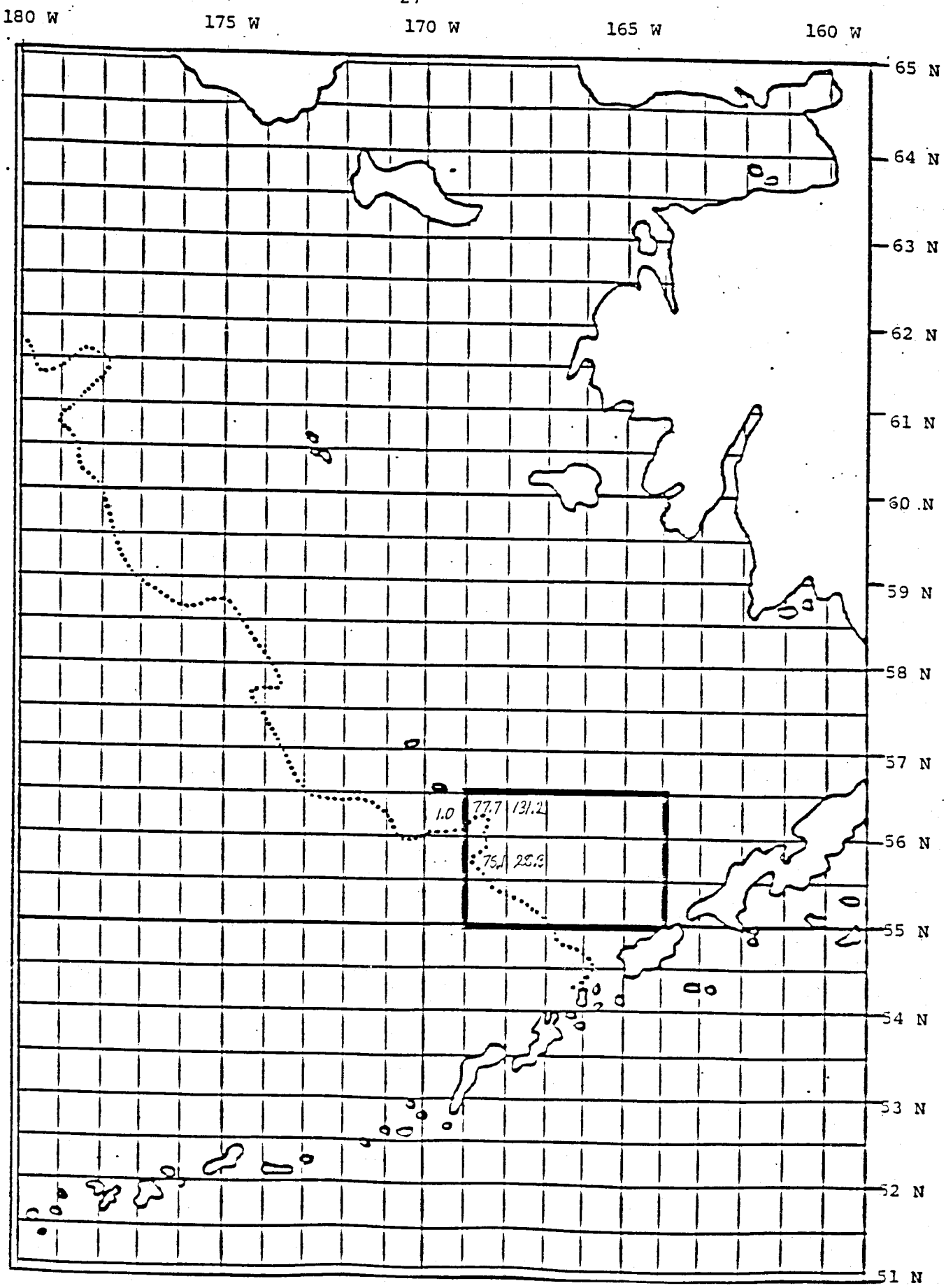

Figure 7. Pollock CPUE (mean t/day) for Japanese surimi trawlers by statistical blocks, June 1983.

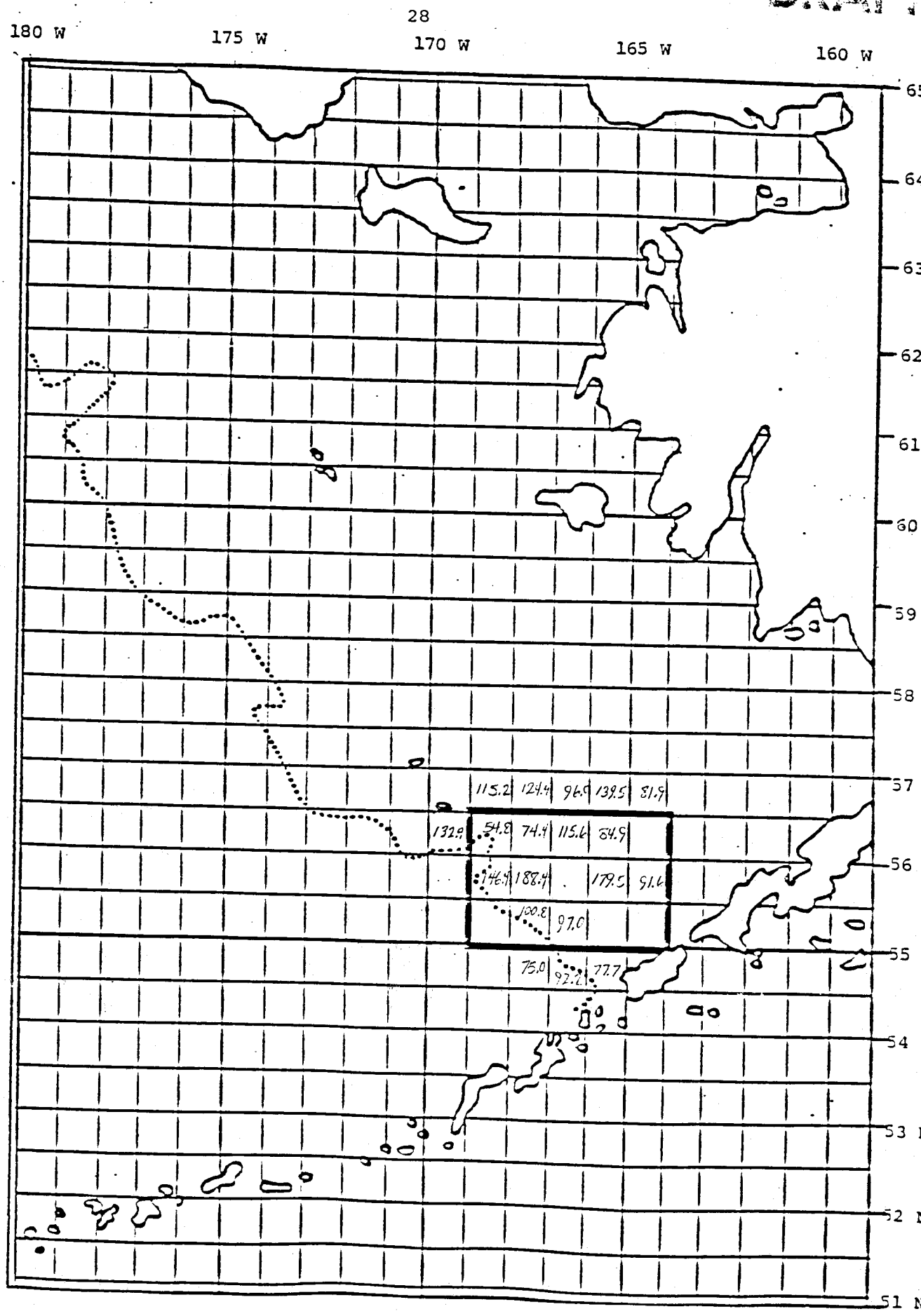

Figure 8. Pollock CPUE (mean t/day) for Japanese surimi trawlers by statistical blocks, July 1983.

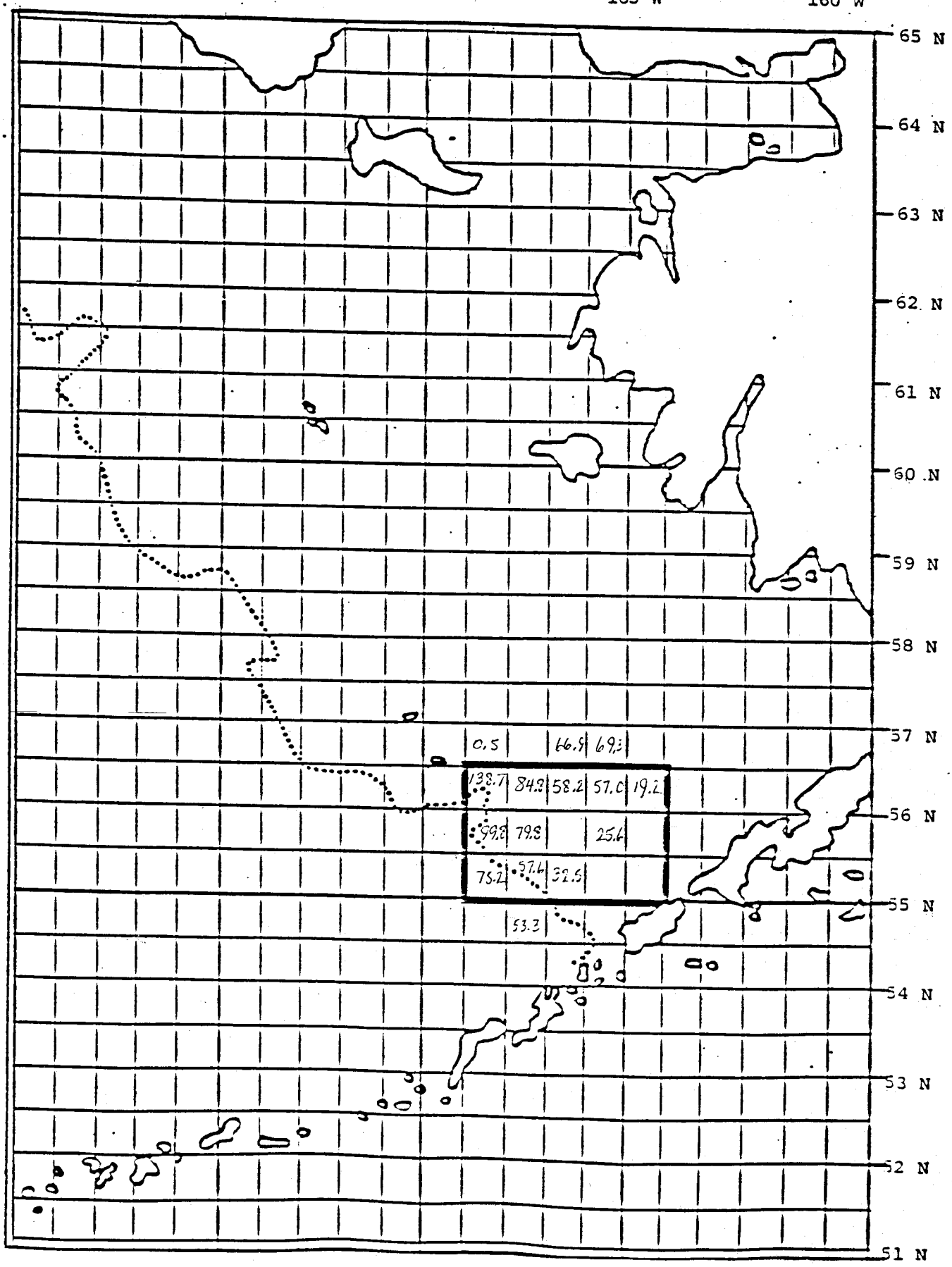

Figure 9. Pollock CPUE (mean t/day) for Japanese surimi trawlers by statistical blocks, August 1983.

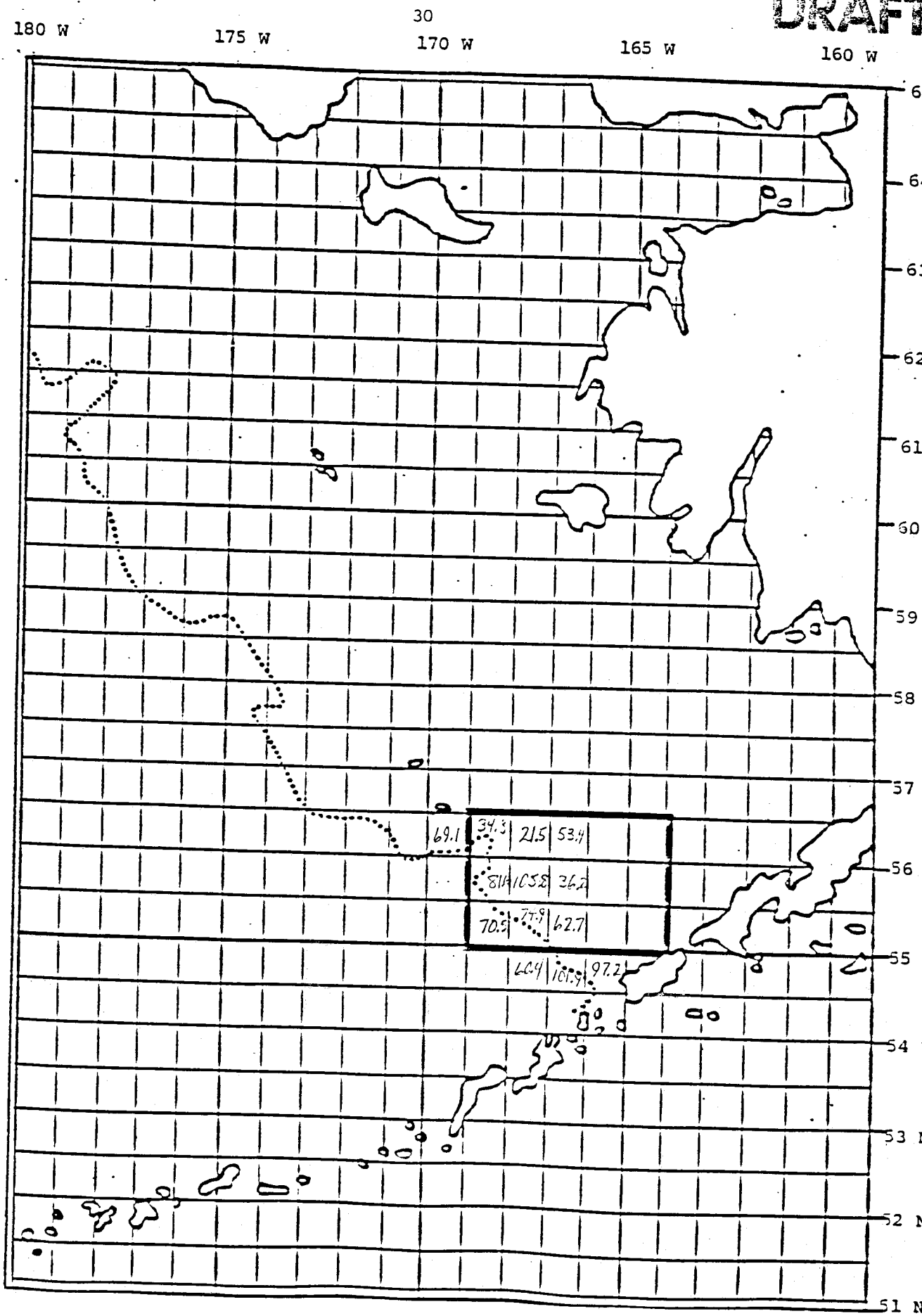

Figure 10. Pollock CPUE (mean t/day) for Japanese surimi trawlers by statistical blocks, September 1983.

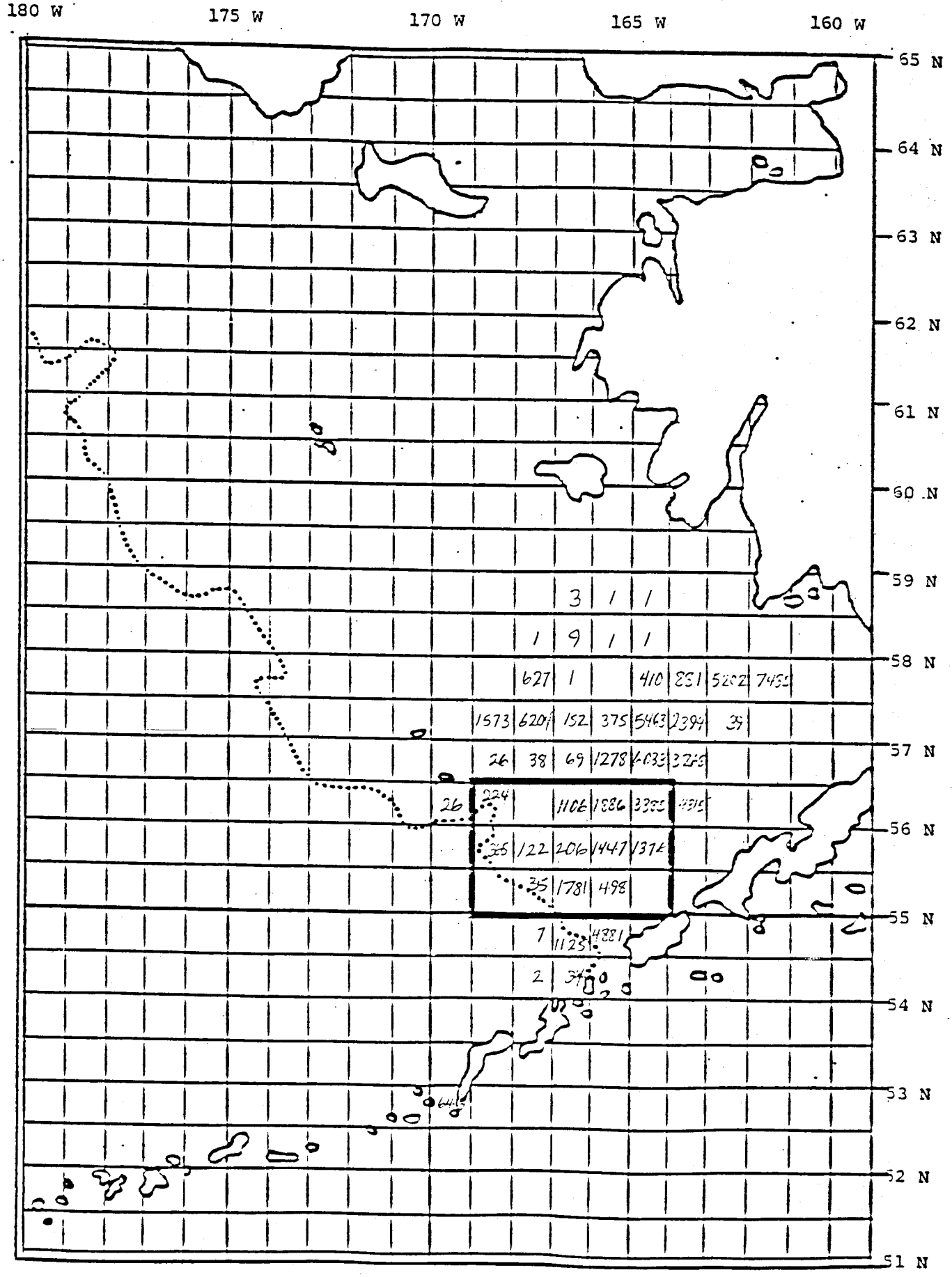

Figure 11. Total catch (t) of pollock for all nations and vessel classes by statistical blocks, June 1983.

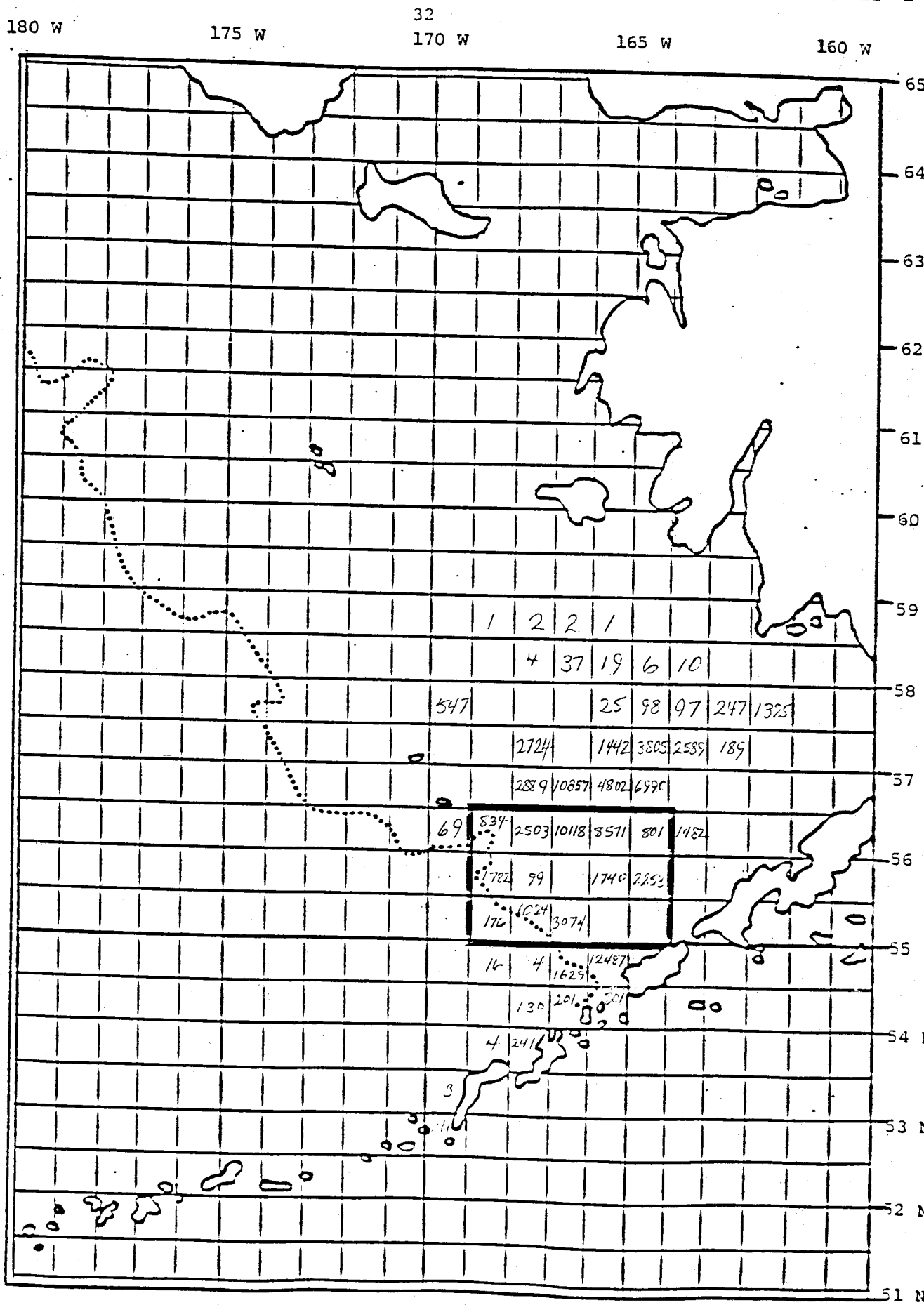

Figure 12. Total catch (t) of pollock for all nations and vessel classes by statistical blocks, July 1983.

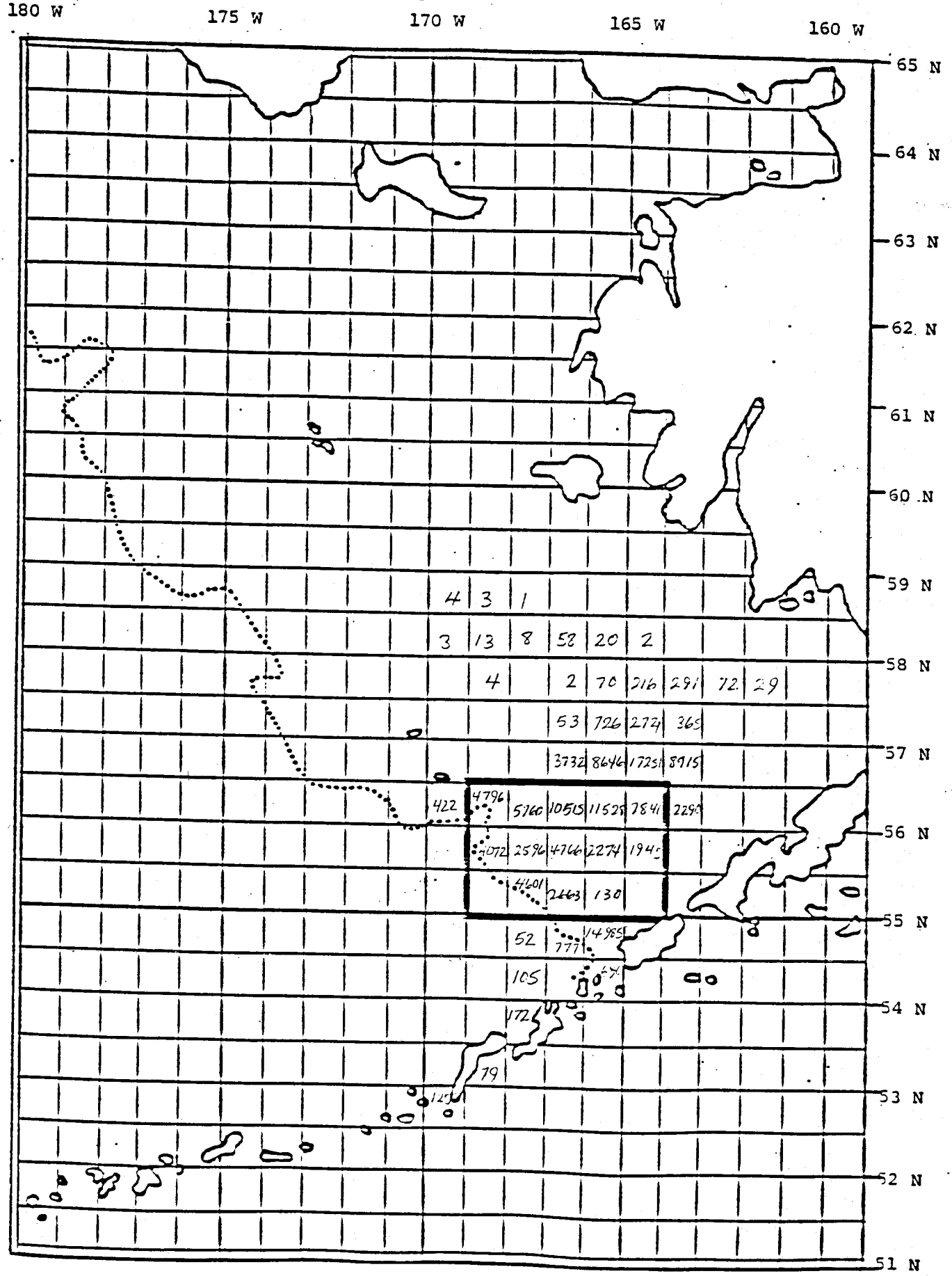

Figure 13. Total catch (t) of pollock for all nations and vessel classes by statistical blocks, August 1983.

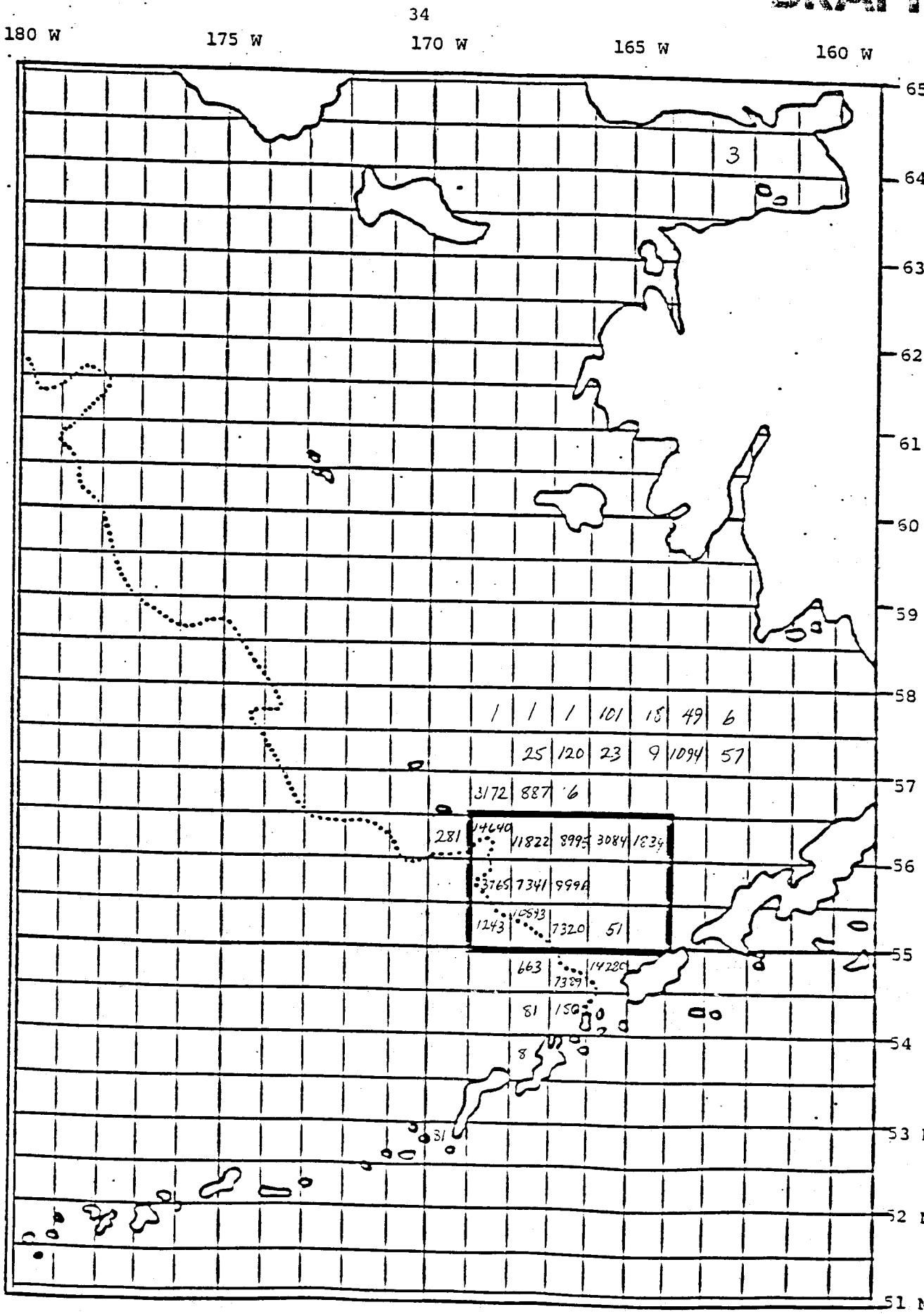

Figure 14. Total catch (t) of pollock for all nations and vessel classes by statistical blocks, September 1983.

the nation's PSC limit is reached, the Salmon Savings Area is closed to trawling by that nation for so much of January - March and October - December that remains in the fishing year. Any subsequent salmon catch during the year is deducted from the nation's limit for the next year. An incidental catch reduction schedule has been in effect since 1982, effectively reducing the number of salmon caught each year.

Due to the short time domestic vessels have operated in the Bering Sea/Aleutian Islands management area, no such catch restrictions or penalties have been implemented for U.S. trawl vessels. In 1983 an increase in joint venture agreements between U.S. catcher vessels and Japanese processing vessels led to a nearly tripling of the U.S. pollock catch in the Bering Sea. At the same time, the U.S. catch of salmon increased from 2,382 in 1982 to 24,493 salmon in 1983 (Table 2). In 1984, joint ventures took a total of approximately 60,400 salmon, 99.9% of which were chum (Table 3).

This high salmon bycatch by joint ventures has been concentrated in a relatively short time period and small area. For example, in 1983 high catch rates began on July 31, peaked on August 16 and were over by August 25 (Figure 1). While this figure reflects only hauls where 50 or more salmon were captured, it is indicative of all catches in this time and area. Table 4 shows the monthly summaries of salmon catch and the corresponding groundfish catches in INPFC statistical areas 1,2, and 4. These data are also shown by location in Figure 2. High salmon bycatches occurred between 54°30'N and 56°N and between 164°W and 169°W in 1984.

Joint ventures operating during this time in this area are targeting on dense concentrations of pollock. From June through September of 1984 joint ventures took 158,516 mt of groundfish with a U.S. exvessel value of $14.74 million (Table 5). During July and August 96,108 mt was taken at a value of over $8.9 million.

Table 5. Joint venture catch of groundfish (metric tons) and salmon (numbers of fish) in INPFC Area 1, June - September, 1984.

	Salmon Catch	Groundfish Catch	Groundfish Value[1/]
June	147	39,997	$3,719,721
July	1,419	41,259	3,837,087
August	56,909	54,849	5,100,957
September	491	22,411	2,084,223
Total	58,966	158,516	$14,741,988

1/ at $93/mt

A review of pollock CPUE data for Japanese surimi trawlers indicates that most of the ½° x 1° areas of highest CPUE are within the proposed closure area (Figures 3-14). Similar data for joint ventures are not available; however, given the distribution of salmon catches in 1984, it is apparent that joint ventures were fishing in much the same area.

Since all U.S. salmon stocks are fully utilized in traditional nearshore and subsistence fisheries in the U.S., the increasing amounts of salmon harvested by the joint venture fisheries are of great concern to all users and managers.

B. ALTERNATIVE MANAGEMENT MEASURES INCLUDING THOSE PROPOSED

There are five identified approaches to reducing the incidental catches of chum salmon by joint venture trawling:

1. Restrict the joint venture fisheries from operating in the area bounded by 55°00'N latitude to 56°30'N latitude and 164°W longitude to 169°W longitude during the period July 20 through August 25.

2. Restrict the joint venture fisheries from operating in the area bounded by 55°00'N latitude to 56°30'N latitude and 164°W longitude to 169°W longitude during the period July 20 through August 25 after a prohibited species catch limit (for example 10,000) of chum salmon are taken in the area beginning July 1.

3. Impose individual joint venture incidental catch quotas for chum salmon.

4. Impose incidental catch fees for chum salmon.

5. Status quo.

C. REGULATORY IMPACTS OF THE ALTERNATIVES

Impacts on Joint Venture Operations

Data compiled by U.S. observers on joint venture processor vessels (Narita et al. 1985) indicate that high incidental catches of salmon were taken in 1983 and 1984 in the area (55°00'N-56°30N from 164°W-169°W) during July 20 through August 25. This time-area window encompasses incidental catch rates ranging from 2.08 salmon per ton of groundfish (mostly pollock) to 12.66 salmon per ton of groundfish in 1983 and 1984. Outside of this time-area window, salmon incidental catches were generally small and usually less than 0.5 salmon per ton of groundfish. Therefore, the time-area closure in Alternative 1 appears to be a feasible mechanism to control and reduce incidental catch of salmon in the joint venture fisheries.

If the time-area closure is imposed, however, it is important to determine if the joint venture fisheries can achieve their groundfish/pollock catches either (1) outside the area during the July 20 to August 25 closed period or (2) inside the area outside of the July 20 to August 25 closed period. Judging from foreign fisheries experiences in 1982 and 1983, it appears that many of the highest concentrations of pollock (i.e. highest CPUE) occured within the proposed closure. Therefore, joint venture fisheries may have great difficulty in achieving their pollock quota by either fishing outside the proposed time-area closure or inside the area outside of the closed period. The available data seem to indicate that joint venture CPUEs may be lower outside the proposed time/area closure, thereby increasing costs. It is hard to predict where the boats would go as an alternative to the closed area

and what pollock densities they would encounter, so estimating the possible increased cost is difficult.

Alternative 2 is somewhat less restrictive than Alternative 1 and would be valid if achievement of pollock quotas was in question under Alternative 1. Alternative 2 would increase chum salmon by-catches to the maximum levels set by regulation but would allow joint ventures the opportunity to change their gear or fishing patterns to reduce their prohibited species catch. Unless PSC quotas could be given to individual vessels or companies, however, it is possible that one vessel could capture the entire PSC and close down the entire fleet.

Alternative 3 would impose individual joint venture incidental catch quotas. In the absence of an easily imposed time-area closure this alternative allows for maximum flexibility for each joint venture to maximize its targeted catch within the bounds of its incidental catch quota. If quotas are transferable among joint ventures, then this efficiency is increased.

Alternative 4 would impose incidental catch fees on the involved joint ventures. Bycatch fees like individual bycatch quotas would impose a U.S. management cost on the fishery which Alternative 1 avoids. Bycatch fees by law go directly to the general fund and would not be available to provide compensation to the domestic salmon industry. Given this restriction, it might be difficult to collect revenues to provide direct compensation for salmon fishermen. Selling quotas to individual joint ventures at their fair market value or a similar approach might accomplish this.

It is difficult to determine what bycatch fees should be established since affected salmon fishermen would receive no monetary benefit regardless of the fee. The bycatch fee system would reduce salmon bycatch only if it is high enough to discourage "sloppy" fishing. Perhaps a fee of $25-$55 per pound (the approximate value of chum salmon to salmon fishermen) would suffice. This would inpose a cost of approximately $75,000-$165,000 on the joint venture industry, or approximately 1-2% of their roughly $8 million total groundfish ex-vessel value, if the salmon catch remained at 60,000 fish. The management cost of administration of fees on quotas does exceed that of a simple time-area closure.

The final management alternative is the status quo. Since salmon are prohibited the gross revenue estimates obtained earlier for inshore salmon fisheries are simply lost since handling mortality is 100 percent. However, joint ventures could continue to maximize the groundfish catches with the current minimal restrictions.

Impacts on the Domestic Salmon Fishery

It is not possible at this time to determine the origin of the chum salmon harvested incidentally by joint venture trawlers. Tagging studies in previous years by U.S. and Japanese scientists for the International North Pacific Fish Commission (INPFC) were generally conducted outside this time/area window. However, from those and other studies it is apparent that a wide variety of stocks migrate through the eastern Bering Sea and North Pacific Ocean.

Japanese, Soviet, Alaskan and other U.S. stocks have been identified in the general area. For discussion purposes only, a "worst case" scenario will be presented. In this example, all chum salmon in the area will be considered to be of North American (U.S.) origin, primarily Alaskan.

The salmon resources of this area are fully utilized by traditional inshore fisheries, and the status quo represents a de-facto allocation away from these users. The social and subsistence values of fishing are not quantifiable, but are significant. The economic loss in actual dollars, i.e. gross earnings, may not adequately reflect the importance of the local fishery. The region affected is generally a cash-poor economy and alternative means of generating cash are limited. The following summary should be viewed in this light.

Table 6 calculates the potential loss in gross earnings to salmon fishermen in traditional fishing areas. Using the 1984 incidental catch of chum salmon in joint venture operations, a potential loss in gross earnings of $127,841 was calculated. Two discount rates were used to calculate the discounted present value of the loss if it continued over a five-year period. At a 5 percent discount rate this amounted to $681,326 and at 10 percent, $612,459. This measures the present value of the accumulated direct loss to U.S. salmon fishermen over a five-year period.

Table 6. Estimating the Potential Loss in Gross Earnings to Domestic Salmon Fishermen Resulting from the 1984 Incidental Catch of Chum Salmon by Joint Venture Activity in the Bering Sea/Aleutian Islands Area.

	CHUM SALMON
Incidental catch (number of fish)	60,400
Handling mortality rate	100%
Initial loss (number of fish)	60,400
Annual natural mortality rate	10%
Years to target fishery	.83
Survival rate	92%
Potential loss (number of fish)	55,568
Utilization by domestic fishermen	60%
Loss to domestic salmon fishermen (number of fish)	33,341
Average weight (lbs., round weight)	7
Loss to domestic fishermen (lbs.)	233,386
Exvessel price ($/lbs. round weight)	$.25-.55/lb.
Potential loss in gross earnings	$58,346-$128,362

Discount rate	5%	10%
Discounted present value of the loss over 5 years	$310,956-$684,103	$279,525-$614,955

A time-area closure as proposed in Alternative 1 would provide maximum accessibility by the domestic salmon fishery to chum salmon now caught incidentally in joint venture operations. However, due to the migratory nature of chum salmon through both time and area, bycatches are likely to occur outside the proposed area. There are no data to predict what these bycatches might be. Alternatives 2 and 3 involve a predictable level of

incidental catch by joint ventures but an unpredictable impact on salmon fishermen. Alternative 4 (bycatch fees) involves an unpredictable level of incidental catch by joint ventures and an unpredictable impact on domestic salmon fishermen.

To the extent bycatch restrictions imposed on joint ventures permits have some resource conservation purpose and are not imposed solely for economic allocation purposes they are an agreement with the intent of the Act . It is unclear whether this incidental harvest of chum salmon constitutes a conservation problem in terms of overfishing. Most western Alaska chum salmon stocks are in healthy condition and in this case the problem is one of reallocating a fully utilized resource to a new user group. However, some chum stocks, most notably Yukon River fall chum, are seriously overfished already in traditional in-river fishing areas. In this case a high seas intercepting fishery could impose significant harm to the resource. Because it is not possible at this time to determine the origin of chum salmon harvested by joint venture fisehries, it is not possible to state conclusively whether the problem is purely allocational or involves overfishing as well. Given a "worst-case" scenario, however, it is not reasonable to assume that the majority of the intercepted chum salmon would be Yukon River fall chums. The total North Pacific Ocean/Bering Sea chum salmon population is several million fish and it is extremely unlikely that any particular stock of fish would be concentrated as immatures in this area.

For this same reason, it is unlikely that the incidental bycatch is made up of entirely Alaskan fish. In fact, the single coded wire tagged fish was from Washington state. Therefore, something less than 100% of the fish are of U.S. origin, and the actual proportion is probably between 20%-90%. However, under both the BSAI Groundfish FMP and the Salmon FMP, the use of trawl gear to harvest salmon is illegal and salmon, regardless of thier origin, are classed as prohibited species to trawl fisheries.

Concern over high rates of salmon interception was addressed in Amendment #3 of the BSAI Groundfish FMP and a reduction schedule for by-catches of (primarily) chinook salmon by foreign trawlers was outlined. American trawl fishermen are not addressed by current salmon restrictions because prior to 1983 they harvested few salmon. However, as domestic fishing replaces foreign fishing, regulations to control the incidental catch of salmon and other prohibited species will be needed.

The chum salmon at issue in this amendment are an important resource to the coastal communities, especially those of Western, Southcentral, and Southeastern Alaska, and are harvested by a large number of small harvesting entities. Because salmon by regulation are prohibited to trawl gear and must be returned to the sea, the value of the catch cannot be realized by this harvesting group. Hence wise use of the resource is in question.

Impacts on the Consumer

The incidental catches of chum salmon at issue represent less than one percent of Alaska statewide catches of chum salmon. Statewide harvest in 1984 was 12,309,000 fish. Much of this harvest goes into the canned product form and is generally considered to be inferior in quality to that of pink and sockeye salmon.

The impact on local consumers (e.g. Western Alaskan subsistence users) may be relatively more important, as it may constitute a significant protein source in an area where few alternative sources exist. Further analysis is not possible due to lack of available data, but the overall impact is not believed to be major.

Impacts on Management and Enforcement Costs

The enforcement division of NMFS sees no significant increase in enforcement costs with the mandatory time-area closure (Alternative 1). Current surveillence practices are adequate to enforce compliance with this closure.

Enforcement of a salmon PSC limit or quota (Alternatives 2 and 3) could be extremely difficult due to the rapid rate at which the limits might be reached. For example, in August 1984 joint ventures averaged over 1800 salmon per day. To effectively monitor and control joint venture activities, observers and enforcement officials would need to increase their efforts substantially during the entire two month period.

Alternative 4 (bycatch fees) would have an associated management cost in determining and collecting fees. No other management costs are foreseen.

Alternative 5 (status quo) would be similar to Alternative 1 in that no additional monitoring or surveillance would be required.

Alternatives 1 and 5 are seen incurring the least increase in management costs of the proposed alternatives. Alternatives 2 to 4 all involve at minimum the setting of an overall incidental catch quota and at maximum thorough detailed study of the economic mechanics and implications of setting fees or individual quotas.

D. SUMMARY

A time-area closure (Alternatives 1 and 2) would provide maximum accessibility to the chum salmon resource by domestic salmon fishermen at the least management and enforcement cost. A time-area closure appears to be a particularly effective management alternative for protecting chum salmon appear in such dense concentrations in such a small time-area window. However, the value of joint venture harvests during the proposed closure approached $8 million in 1984, and forcing joint ventures out of that window might substantially reduce thier earnings or increase their costs.

Alternatives 2 to 5 all imply a direct loss to traditional U.S. salmon fishermen. It implies a foregone harvest to domestic salmon fishermen and also a foregone harvest value to joint venture fishermen.

Alternatives 2 and 3, even with 100 percent observer coverage, would be difficult to monitor and enforce and would increase enforcement costs. Alternative 4 would imply management costs larger than those implied by Alternative 1 but might be a means to replace some portion of the costs to inshore salmon fishermen if the bycatch fees could be so designated.

V. RULE 3: Establish measures to reduce the incidental bycatch of fully utilized speices by foreign trawlers in the Aleutian Islands.

A. PROBLEM NECESSITATING THE PROPOSED RULE

U.S. fishing and processing companies operating in the Bering Sea and Aleutian Islands have expanded dramatically in recent years. For example, in 1981 joint ventures in the Aleutian Islands caught approximately 3,800 mt of groundfish (Table 7). This catch reached 19,000 mt in 1982 and climbed to over 50,000 mt in 1984. This rapid increase in domestic harvest has led to full utilization of several groundfish species and greatly increased utilization of others. The Council has identified three species as fully utilized by U.S. fishermen: Pacific ocean perch, sablefish, and Atka mackerel. Pacific cod, while not yet fully utilized in the Aleutians, is also of great economic importance. These species have supported foreign directed fisheries in the past and, although directed fisheries have been curtailed due to reduced allocations, are still taken in varying quantities incidentally to normal groundfish trawl operations. Because of the importance of these species to the development of the U.S. industry it is essential that foreign catches be reduced to the absolute minimum. Modification of fishing practices can reduce these incidental catches but it is doubtful that bycatches can be eliminated entirely by that alone.

Table 7. Joint venture and foreign trawl catches in the Aleutian Islands (INPFC Area 4), 1981-84.

	Pollock	Pacific cod	Atka Mackerel	POP	Sablefish	All Species
Joint Venture						
1981	145	1,749	1,633	0	156	3,769
1982	1,983	4,280	12,429	2	118	19,043
1983	2,547	4,700	10,511	10	70	18,051
1984*	6,736	6,476	35,927	429	272	50,251
Foreign Trawl						
1981	55,346	2,680	15,027	3,660	172	88,362
1982	55,745	1,520	7,117	1,732	147	77,252
1983	56,453	1,870	1,097	651	155	69,663
1984*	71,452	437	71	390	115	75,473

*preliminary

Data from recent years indicate that a substantial portion of the foreign catch of these fully utilized species in the Aleutian Islands has been taken in the immediate vicinity of the islands themselves. In 1983 foreign trawlers harvested a total of 1,870 mt of Pacific cod, 155 mt of sablefish, 738 mt of Pacific ocean perch, and 1,097 mt of Atka mackerel in the Aleutian Islands (Statistical Area 4). Preliminary analysis of observer data for the 1983 fishing year indicate that 92% of the trawl catches of Pacific cod, 88% of sablefish, 92% of rockfish and 66% of Atka mackerel came from within 20 miles of the islands in 1983.

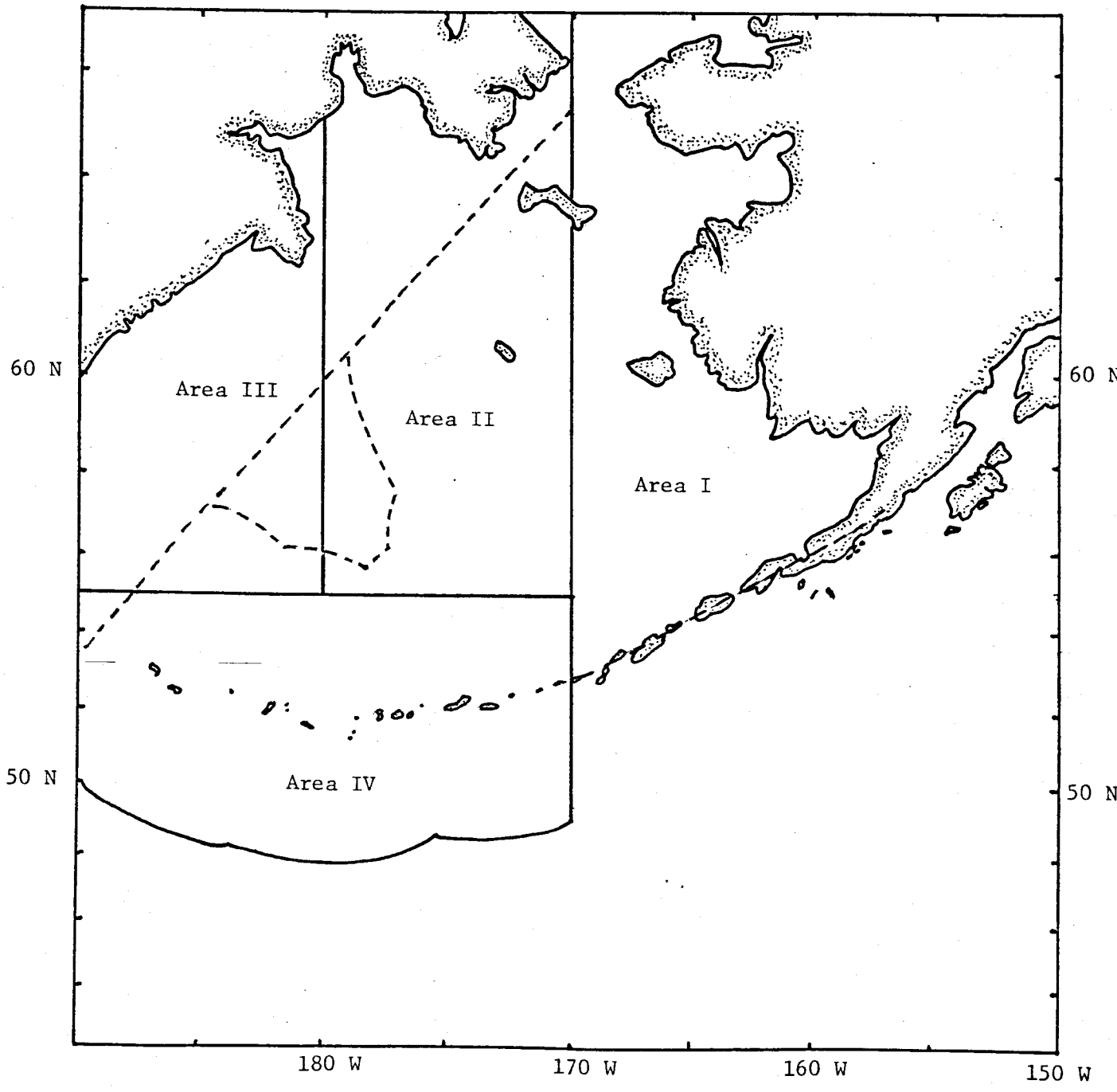

Fig. 15 Fishing areas in the Bering Sea and Aleutians.

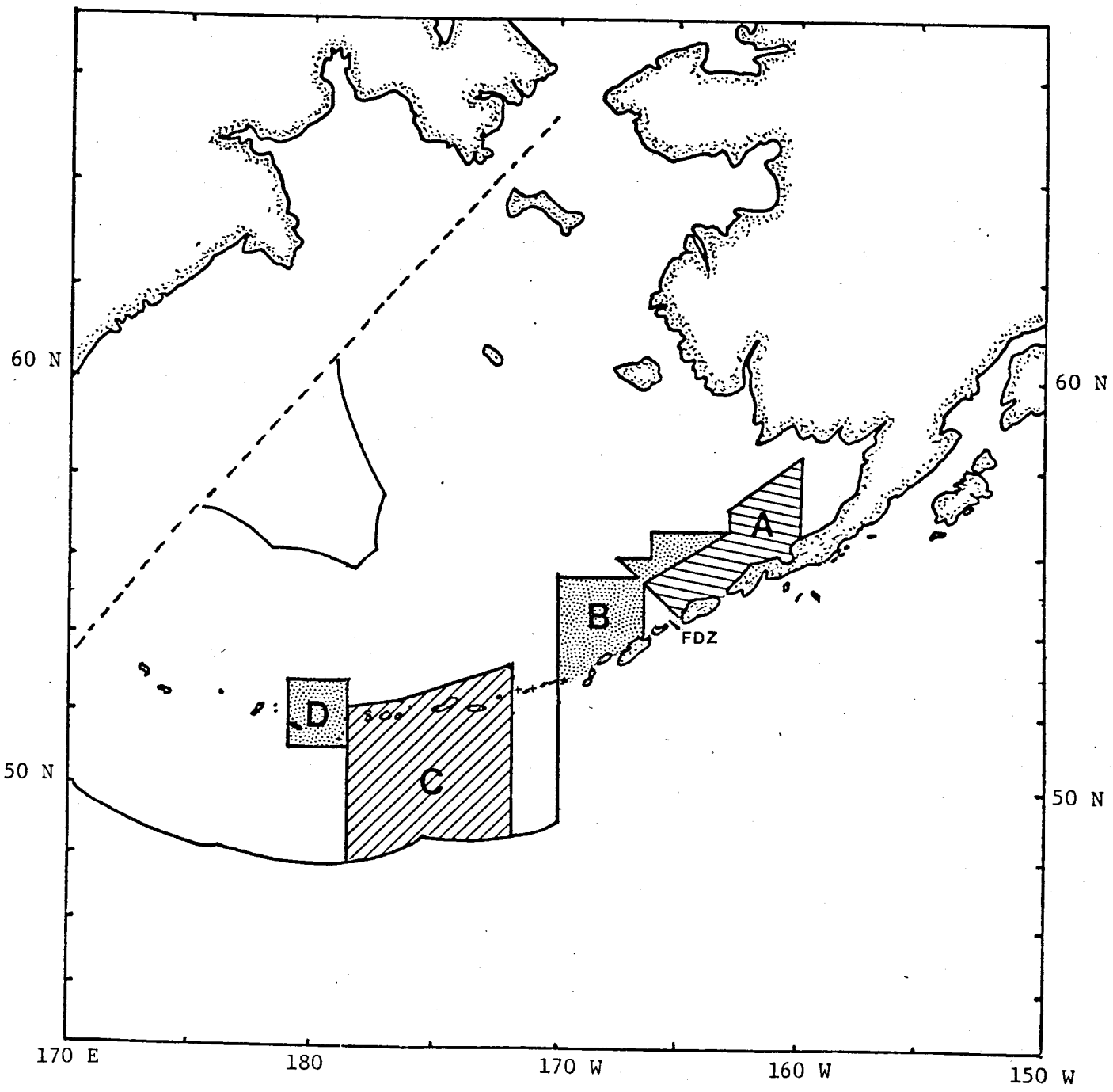

Fig. 16 Areas with special restrictions on foreign and/or domestic fisheries in the Bering Sea and Aleutian Islands Groundfish Plan area.

At the December 1984 North Pacific Fishery Management Council meeting, the Council voted to enact an emergency regulation to close the area within 20 miles of the Aleutian Islands to all foreign trawling for 1985. The proposed rule would continue the Council's emergency regulation for future years. The amendment seeks to reduce foreign bycatch of these speices of fish fully utilized by U.S. fishermen in the Aleutian Islands: sablefish, Pacific Ocean perch and Atka mackeral. Pacific cod, although not quite fully utilized by domestic fishermen, is also a species of concern. The proposed action would also tend to prevent potential gear/user conflict between foreign and domestic fishermen.

Figure 15 shows the major fishing areas in the Bering Sea/Aleutian Islands area. The 20-mile closure would affect foreign trawling in INPFC area IV. Figure 16 and Table 8 indicate the areas of special restrictions on foreign and/or domestic fisheries in the Bering Sea and the Aleutian Islands.

B. ALTERNATIVE MANAGEMENT MEASURES INCLUDING THOSE PROPOSED

There are three basic alternative approaches identified to solve the problems outlined above. They are:

1. To close the area within 20 miles of the Aleutian Islands to all foreign trawling (this is the alternative proposed in the amendment).

2. Status quo (to allocate bycatch quotas for these species to the foreign trawl fleet and allow them to continue fishing in areas currently open).

3. Establish zero TALFFs for all species in the Aleutians (all of Area ~~IV~~) except pollock.

C. REGULATORY IMPACTS OF THE ALTERNATIVES

Impacts on Foreign Groundfish Fisheries

This information shows a 20-mile closure will effectively eliminate foreign trawling in 2° of longitude between areas C and B in Figure 16 (i.e. 170°W to 172°W). Foreign trawling in all other areas within the proposed 20-mile closure area is already tightly restricted. Fishing activity in all of area IV (Figure 15) then is of primary interest in evaluation of this issue. Table 7 reviews the catch history of groundfish for foreign and joint venture trawling for the years 1981-84 in statistical area IV (Figure 15). Table 9 indicates DAP catches in that area for the same years. Table 7 indicates substantial reductions in foreign trawl catches of the fully utilized species (Atka mackerel, Pacific ocean perch and sablefish) have already occurred. The cause or causes for those reductions whether they are due to fleet relocation or other changes in fishing practices, is unknown at present. Observer data to be compiled later in 1985 will indicate whether any reductions are due to the relocation of the fleet. These data are similar to those compiled for 1983 and include observed catches by species in ½° x 1° areas. Also, the Japanese Hokuten trawl fleet underwent major restructuring in late 1984 and fishing practices will probably be different from past years. The number of vessels was substantially reduced and there has been a verbal commitment to comply with U.S. fishing regulations and more accurately report catch data.

Table 8. Bering Sea/Aleutian Islands foreign fishery restrictions by area.

Special Area	Foreign Trawl[1/]	Foreign Longline[2/]
All Areas	Pacific cod allowed in bycatch amounts only.	Directed Pacific cod fisheries allowed only north of 55°N and to the extent ice conditions permit, stay west of 170°W.
Bristol Bay Pot Sanctuary (A)	Closed all year.	Open all year beyond 12 miles.
Winter Halibut Savings Area (B)	Closed 12/1 to 5/31.	Beginning June 1 each year, when longline catch of halibut reaches 105 mt, areas inside 500-meter isobath will close for rest of period 12/1-5/31. Foreign fisheries must stay outside 12 miles.
U.S. Fishery[3/] Development Zone	Closed 12/1 to 9/15	Closed 3/15 to 9/15 in addition to restrictions for Winter Halibut Savings Area above.
Longline Sanctuary (C)	Closed all year.	Unrestricted except for cod.
Petrel Bank (D)	Closed: 1/1 to 6/30. Open beyond 20 miles: 7/1-12/31	Unrestricted except for cod.

1/ Foreign trawlers must fish outside 20 miles in all areas West of 170°W.

2/ Foreign longliners west of 170°W can fish to within 3 miles.

3/ The proposed complete closure of the FDZ to foreign fishing was disapproved by NMFS on December 8, 1983. The restrictions listed above are voluntary and based on an industry agreement made in February 1984 and reaffirmed in February 1985. Current regulations officially close the area to foreign trawlers only from December 1 through May 31.

Table 9. DAP Catches 1981-1984 for Bering Sea/Aleutian Islands INPFC Statistical Area IV (metric tons)

	1981	1982	1983	preliminary 1984
Pollock	58	48	71	12
Sablefish	0*	29	25	3
Pacific Cod	5,249	5,214	4,000	391
Flounder	-	-	-	0*
Pacific Ocean Perch	-	-	-	2
Rockfish	-	-	-	-
Others	0*	-	43	-
TOTAL	5,307	5,290	4,139	408

* Catches less than .5 mt

The TALFF allocations for the Bering Sea/Aleutian Islands area are indicated in Table 10. These allocations reflect the industry-to-industry agreement reached between Japan and the U.S. Japanese trawling interests. Foreign trawling interests might argue that incidental catch allocations cannot be reduced further without disrupting fishing practices. They fear allocations will go so low they will have difficulty allocating adequate amounts to individual vessels to make targetted species fishing possible. In hoping to avert a 20-mile closure, the two Japanese trawling associations submitted to the Council a document entitled "Comments on the Groundfish Issue" dated January 22, 1985 in which were outlined various proposed changes in their trawling practices which would help control the amount of incidental catch.

In considering the options for the closure, it is pertinent to consider the availability of target species inside and outside the area proposed for closure to foreign trawling and how foreign fishing patterns might change in response to the closure. A review of historical catch data provides insight into both of these questions. Figures 17 to 25 show the percentage distribution of foreign catches in 1977 for the following species: 1) all groundfish species combined, 2) pollock, 3) Pacific cod, 4) yellowfin sole, 5) turbots, 6) small flounders, 7) sablefish, 8) POP, and 9) Atka mackerel. In the early 1970s up to about 1978 there were few restrictions on foreign fisheries, and those fisheries tended to focus on areas of highest concentrations of target species. Catch data reflect a degree of exploratory fishing and minor shifts in stock distribution during the period as well, but the distribution of catches has been remarkably stable. In general, the geographical distribution of groundfish catches did not change significantly between 1970 and 1983, although minor variations have occurred from area to area from time-to-time. Data from the 1977 fishing year are typical of this distribution and, because they are from the period of less regulation, are felt to reflect the general distribution of various species throughout the Aleutian Islands area. They clearly indicate that those species for which a Total Allowable Level of Foreign Fishing (TALFF) will be available in 1985 and future years for directed fishing are largely located outside of the proposed closed area. Table 11 summarizes data that essentially illustrates that fishery resources are readily available outside the proposed 20 mile closure

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Table 10. Initial apportionments (mt) of total allowable cach for 1985.

Species	Area	TAC	ITAC	DAP	JVP	Initial TALFF
Pollock	BS	1,200,000	1,020,000	17,680	393,584	608,736
	AI	100,000	85,000	10,540	13,966	60,494
Pacific Ocean	BS	1,000	850	660	120	220
Perch	AI	3,800	3,230	3,300	340	160
Rockfish	BS	1,120	952	600	22	330
	AI	5,500	4,675	30	960	3,685
Sablefish	BS	2,625	2,231	2,275	100	250
	AI	1,875	1,594	1,305	420	150
Pacific Cod		220,000	187,000	100,000	63,190	37,000
Yellowfin Sole		226,900	192,865	1,770	82,200	108,895
Turbot		42,000	35,700	0	5,000	30,700
Flatfish		109,900	93,415	1,200	62,500	41,365
Atka mackerel		37,700	32,045	0	37,600	100
Squid		10,000	8,500	0	70	8,430
Other species		37,580	31,943	0	3,000	28,943
TOTAL		2,000,000	1,700,000	139,360	663,072	929,458

and that the impact of the closure on the ability of foreign nations to harvest their allocations would be insignificant.

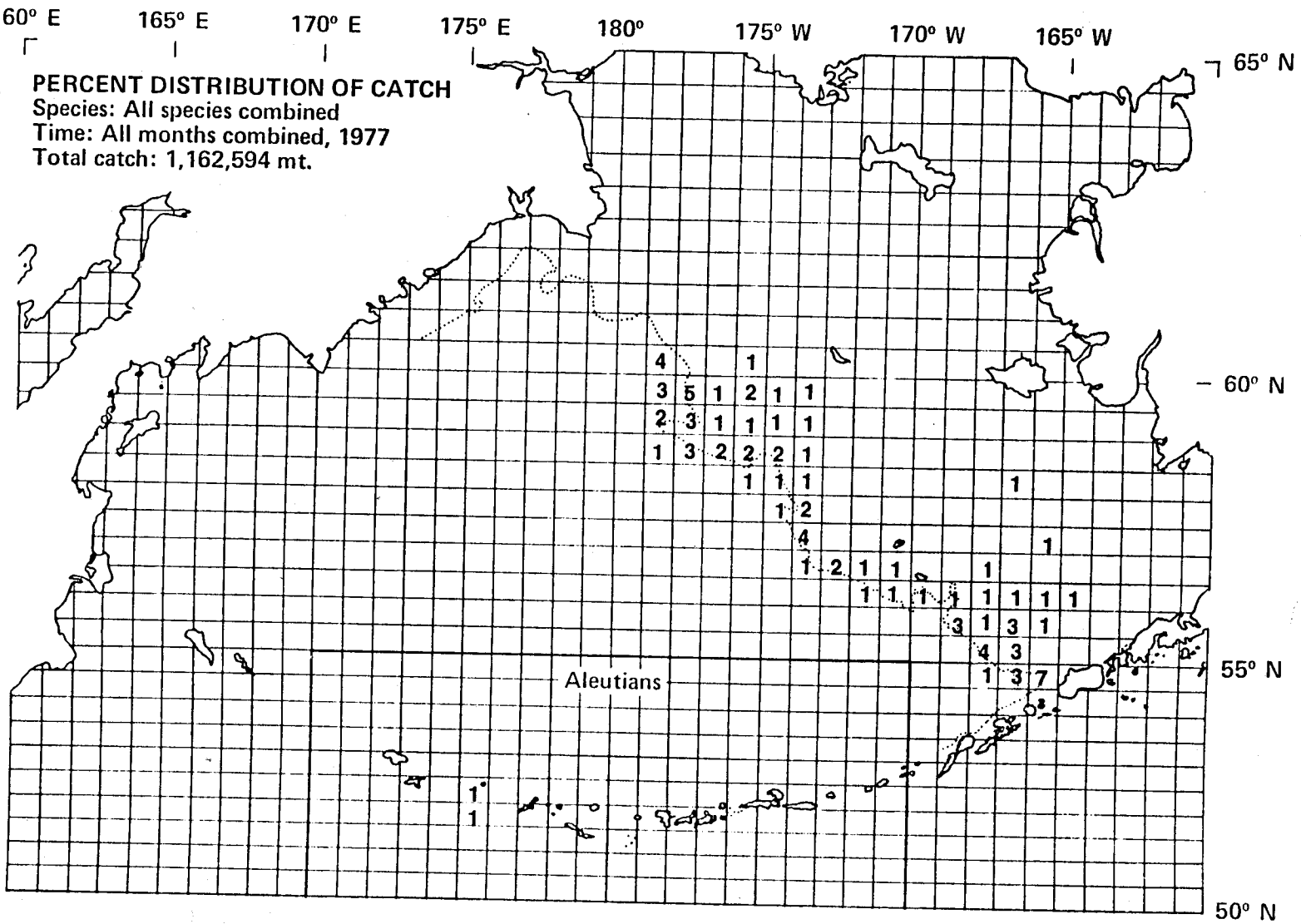
With respect to the five species groups for which a directed TALFF is available, the proposed closure has no effect on three--pollock, yellowfin sole, and other flatfish. The majority of the population of these resources is located and historically harvested outside of the proposed 20 mile closure. With respect to Pacific cod, the effect of the closure on foreign fisheries is negligible. Foreign trawl fisheries are initially allowed only incidental catches (2,000 mt) of Pacific codin the entire Bering Sea/Aleutian Islands management area in 1985. The rest of the initial TALFF (35,000 mt) is designated for the foreign longline fishery substantially north of the proposed closure within 20 miles of the Aleutians. Therefore, the Aleutians closure will have little or no effect on Pacific cod catches, since most of the foreign incidental and target catches are available outside the area. Turbot is the only TALFF species which may not be available for harvest by the foreign fleets in sufficient quantities outside of the proposed closure. About eight percent of the turbots were harvested in the area proposed for closure. If the area is closed, it is possible that the foreign fisheries may not be able to make up that eight percent of the TALFF (or 2,456 mt) in 1985. However, it is much more likely that the remaining catch can be easily taken outside the closed area, since the estimated Equilibrium Yield (EY) and biomass for turbots outside the 20-mile zone are sufficiently large to support the additional 2,500 mt catch.

Finally, the only species group for which foreign nations may be unable to attain their allocations outside the proposed 20-mile zone is the "other rockfish" complex. In the Aleutian region, the TALFF for the complex is 3,685 mt. Almost 33 percent (or 1,216 mt in 1983) has traditionally been caught within 20 miles. If the zone is closed, the foreign fisheries may not be able to make up the entire "lost" catch. However, if, for example, 50 percent can be made up outside 20 miles, which is realistically possible without substantial additional cost to foreign vessels, then the lost opportunity would amount to only about 600 mt for foreign fisheries. Consequently, the negative impact of the closure to foreign fisheries is negligible.

It is not completely clear that effort substitution effects in other areas will not occur. That is, if the 20 mile zone is closed to foreign trawlers, those trawlers will not disappear but rather continue fishing elsewhere. Although they will no longer be fishing in the area of highest concentrations of fully utilized species, it is impossible to predict the level of bycatch they will reach. It is expected that greatly reduced bycatch TALFFs may still be required in the future to ensure low bycatches and prevent covert targetting.

Alternative 2 (Status Quo) would retain the system of bycatch quotas. Absent any action on this issue, the bycatch amounts approved by the Council at their December meeting and clarified at the February meeting would hold. That system allocates bycatch TALFFs jointly with target species TALFF allocations. The bycatch harvests are not prohibited species and once the bycatch limit is achieved, the foreign fishery is closed down. If the Council chose to eliminate or greatly reduce bycatch TALFFs, which is permissable under the status quo, foreign vessels could be completely denied

Figure 17. **PERCENT DISTRIBUTION OF CATCH**
Species: All species combined
Time: All months combined, 1977
Total catch: 1,162,594 mt.



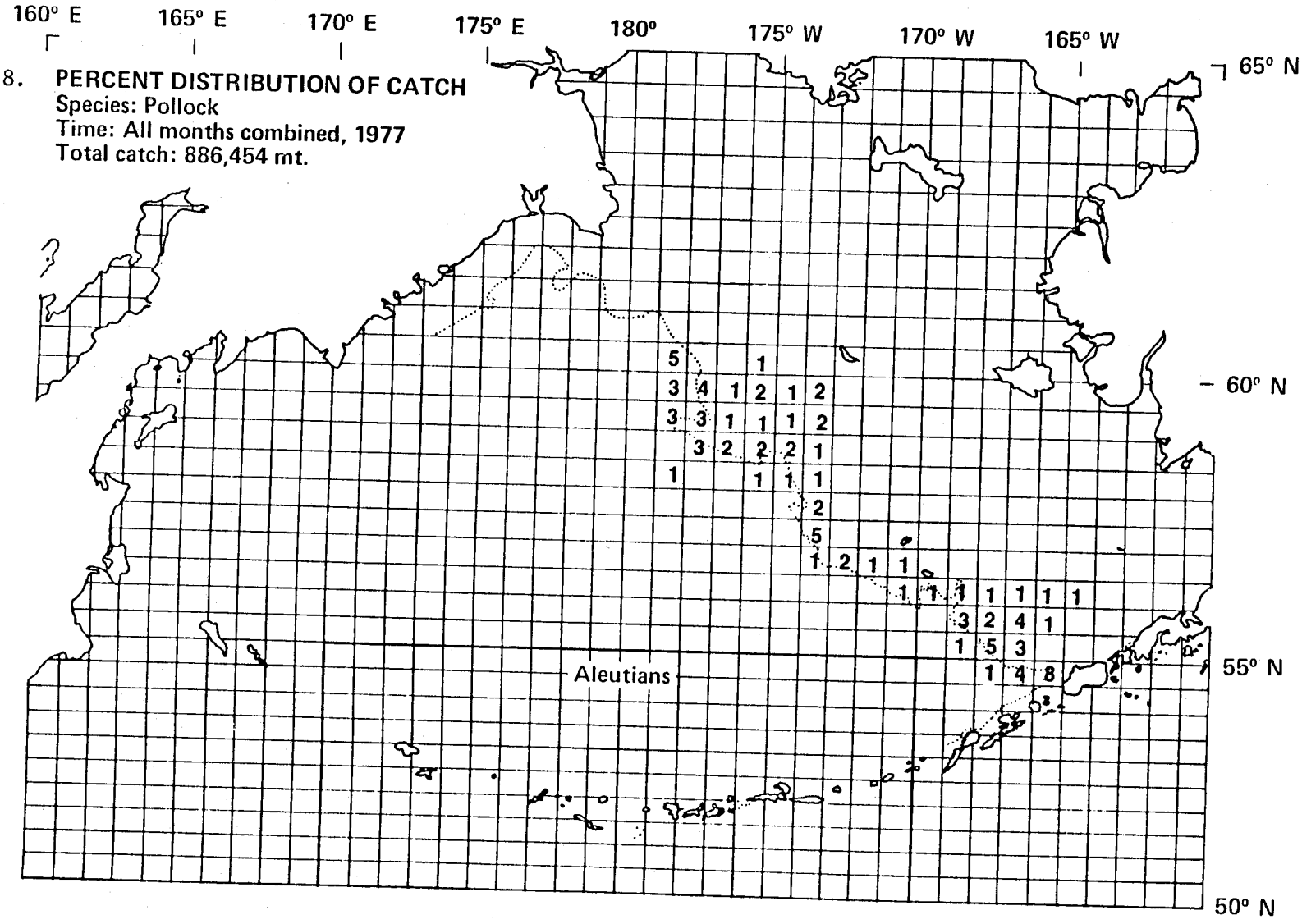


Figure 18. **PERCENT DISTRIBUTION OF CATCH**
Species: Pollock
Time: All months combined, 1977
Total catch: 886,454 mt.

Figure 19. **PERCENT DISTRIBUTION OF CATCH**
Species: Pacific Cod
Time: All months combined, 1977
Total catch: 36,530 mt.

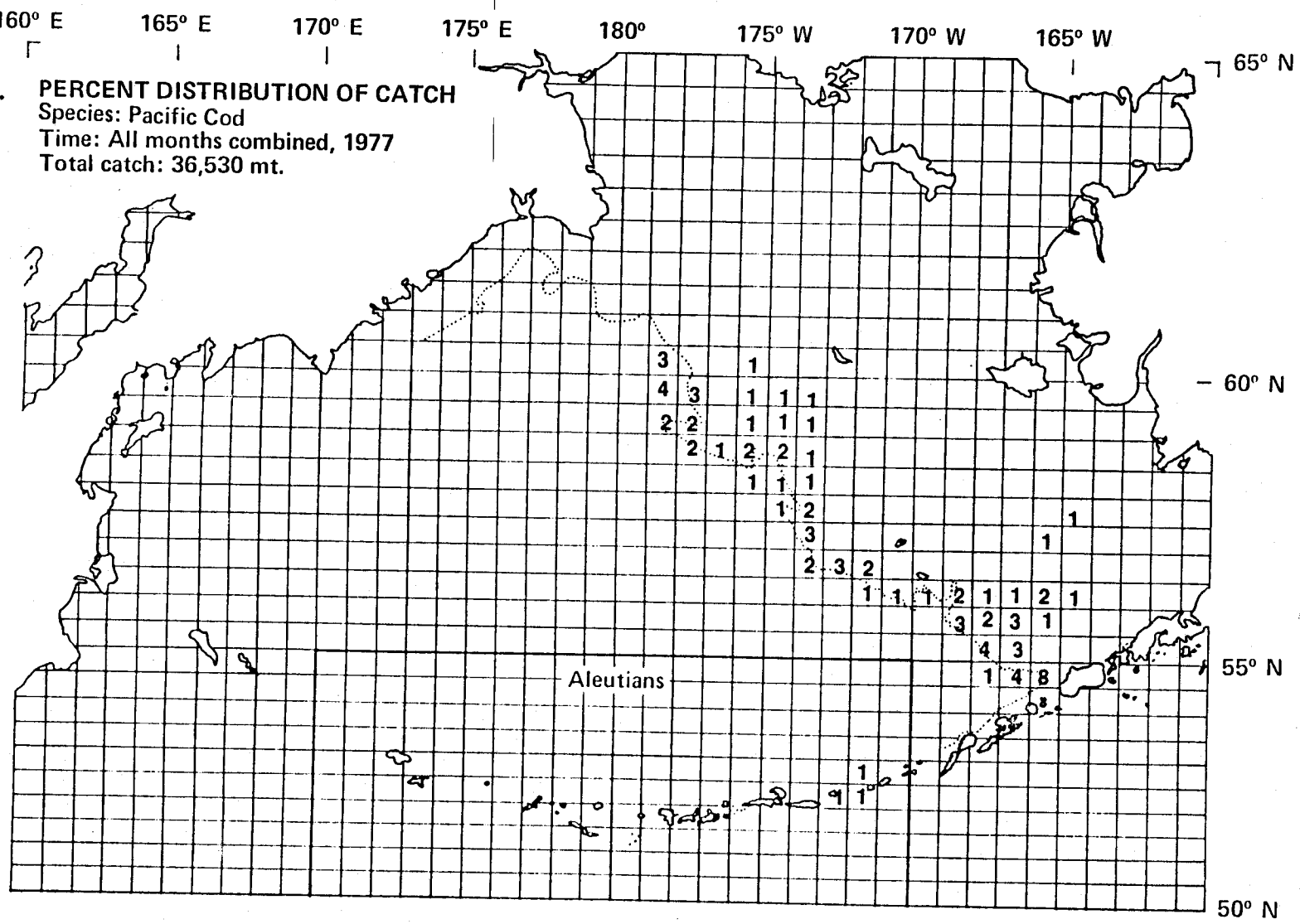


Figure 20. **PERCENT DISTRIBUTION OF CATCH**
Species: Yellowfin Sole
Time: All months combined, 1977
Total catch: 58,524 mt.

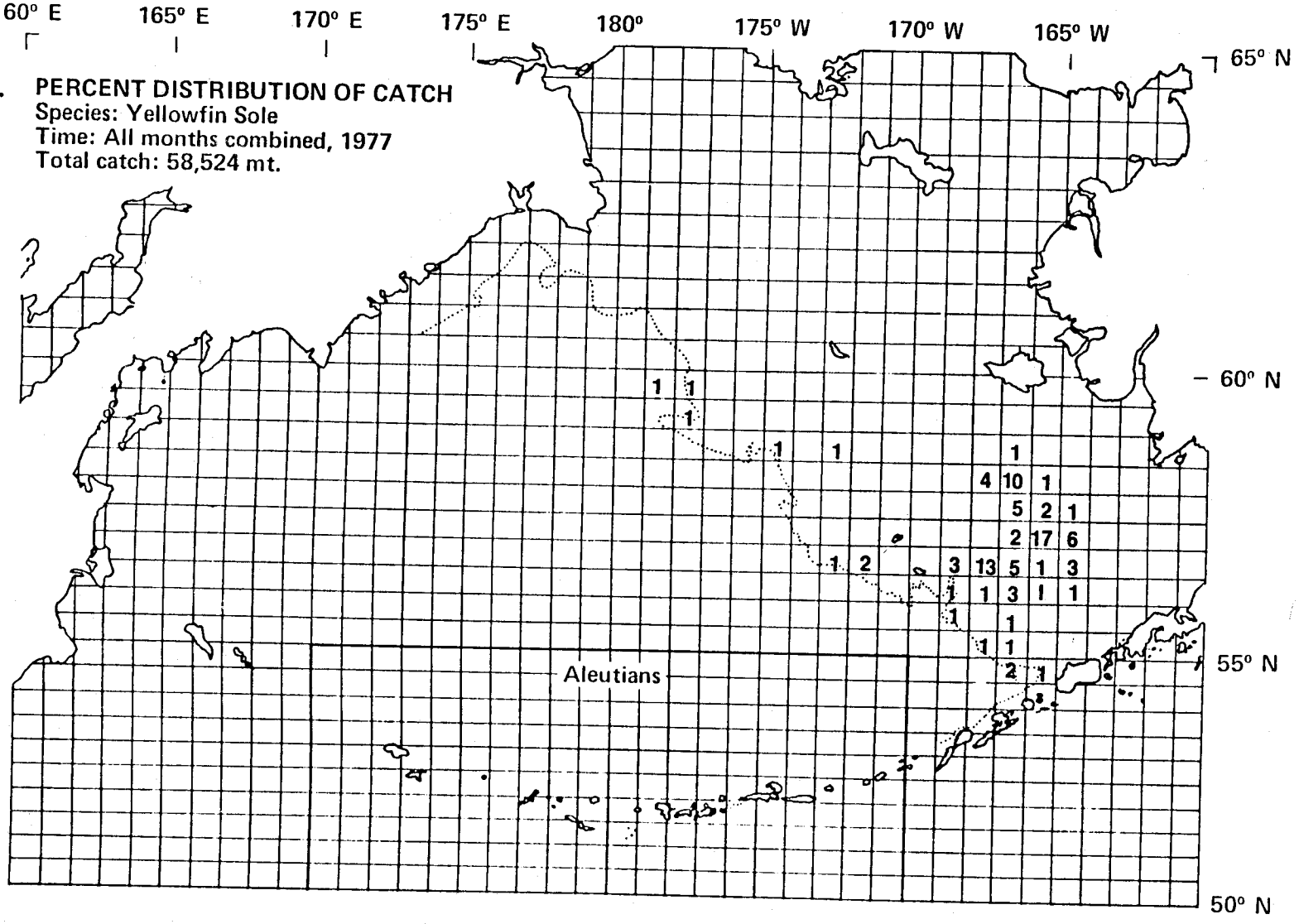
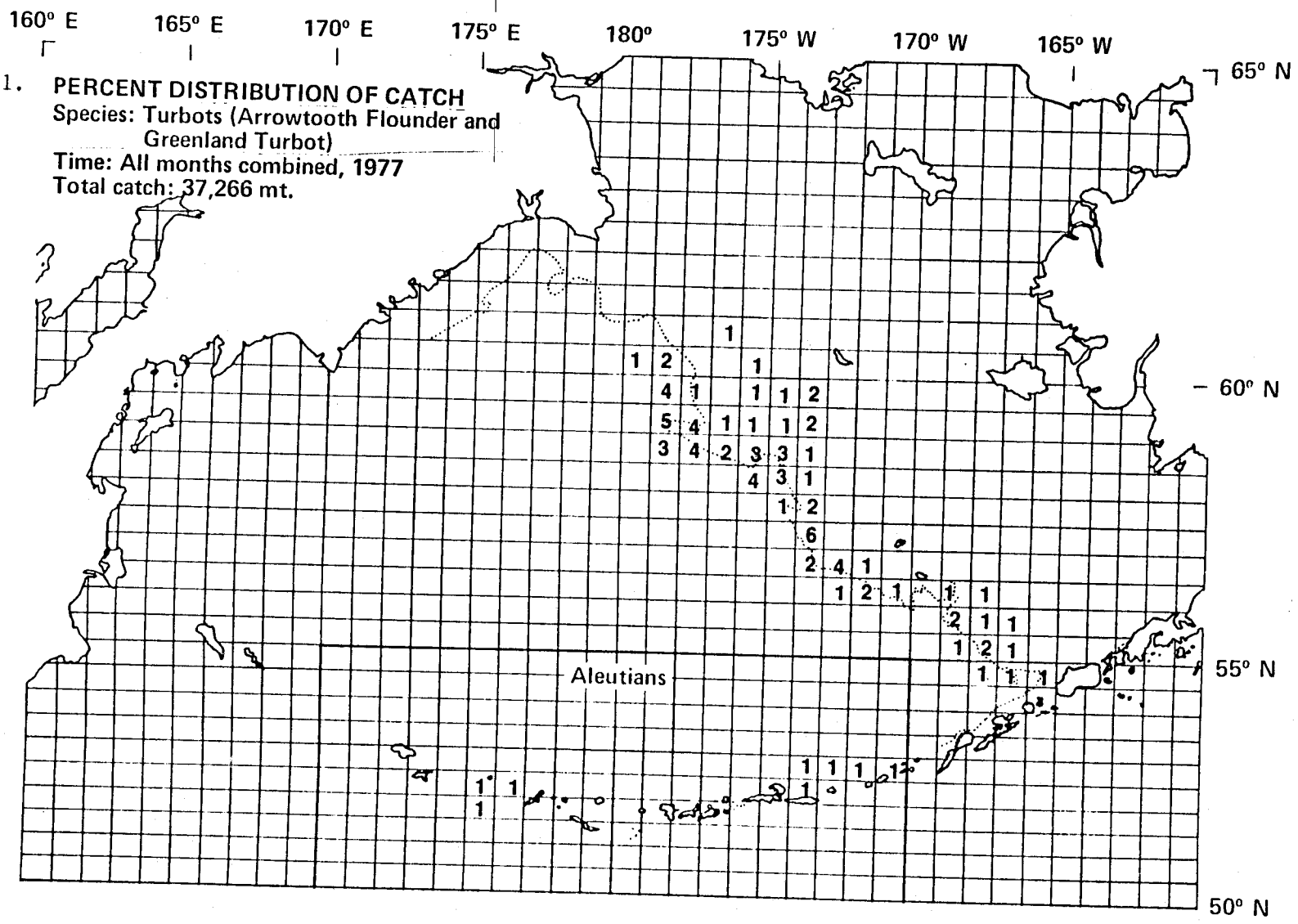


Figure 21. PERCENT DISTRIBUTION OF CATCH
Species: Turbots (Arrowtooth Flounder and Greenland Turbot)
Time: All months combined, 1977
Total catch: 37,266 mt.



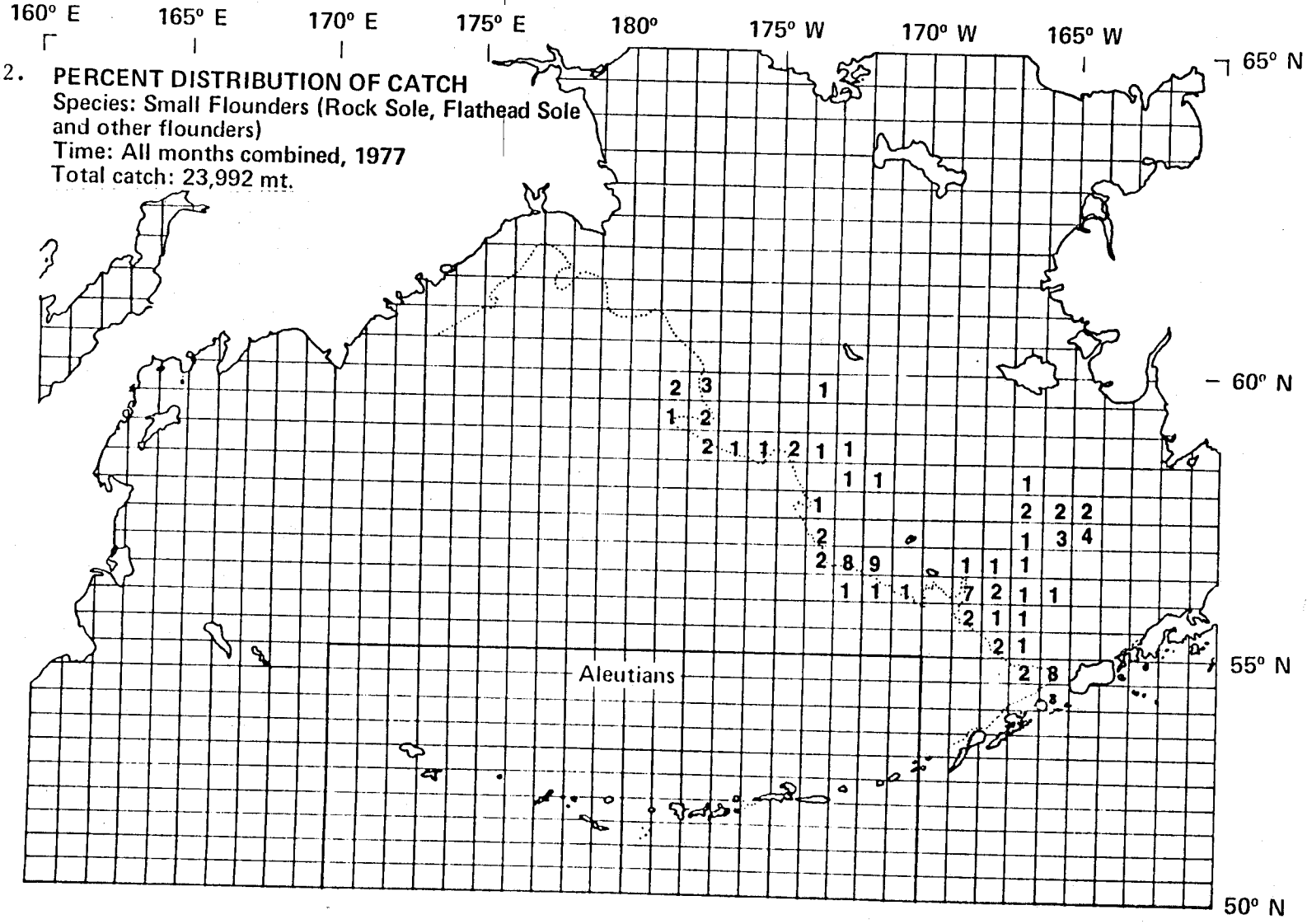


Figure 22. PERCENT DISTRIBUTION OF CATCH
Species: Small Flounders (Rock Sole, Flathead Sole and other flounders)
Time: All months combined, 1977
Total catch: 23,992 mt.

Figure 23. **PERCENT DISTRIBUTION OF CATCH**
Species: Sablefish
Time: All months combined, 1977
Total catch: 4,598 mt.

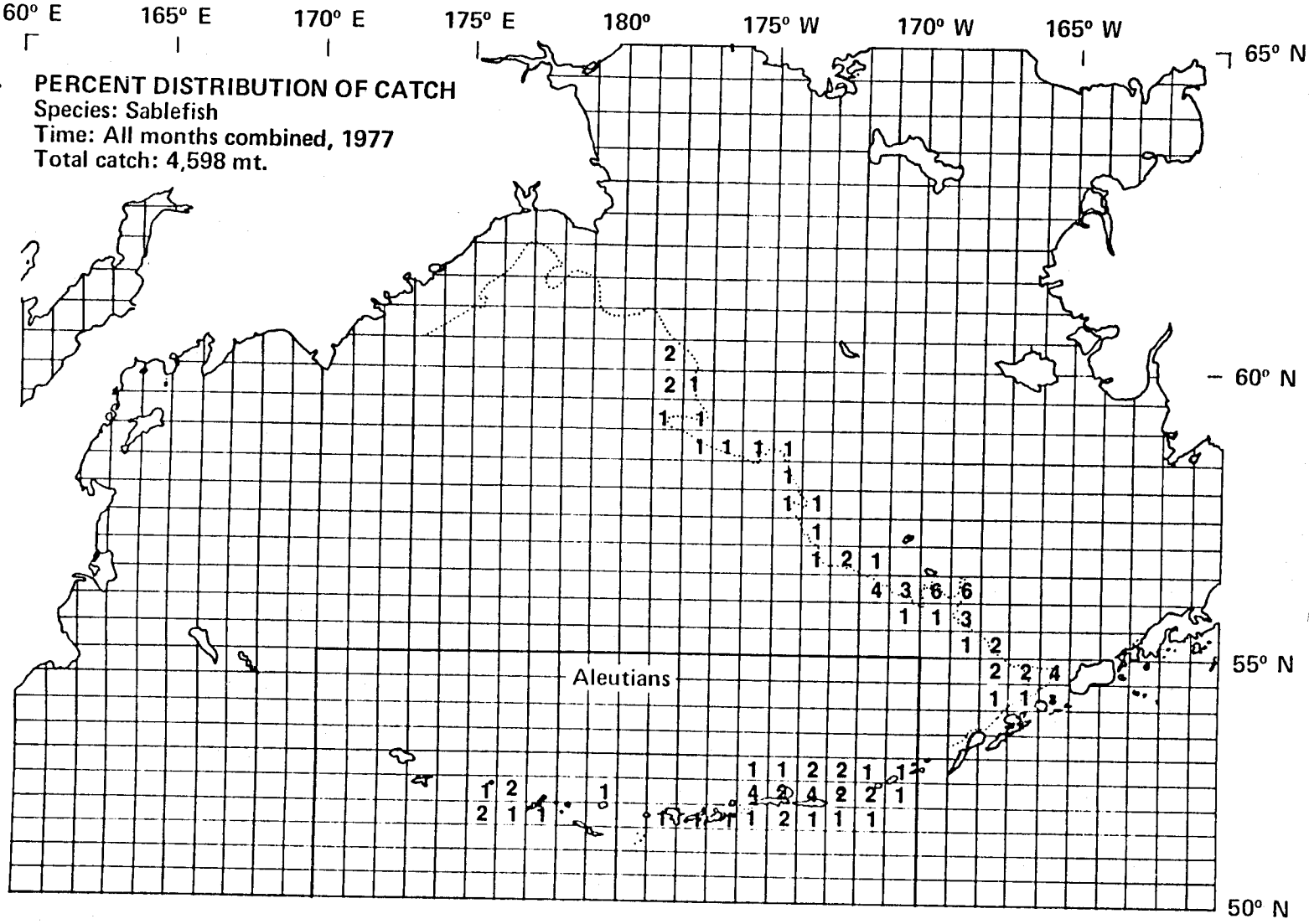


Figure 24. **PERCENT DISTRIBUTION OF CATCH**
Species: Pacific Ocean Perch and other rockfish
Time: All months combined, 1977
Total catch: 21,577 mt.

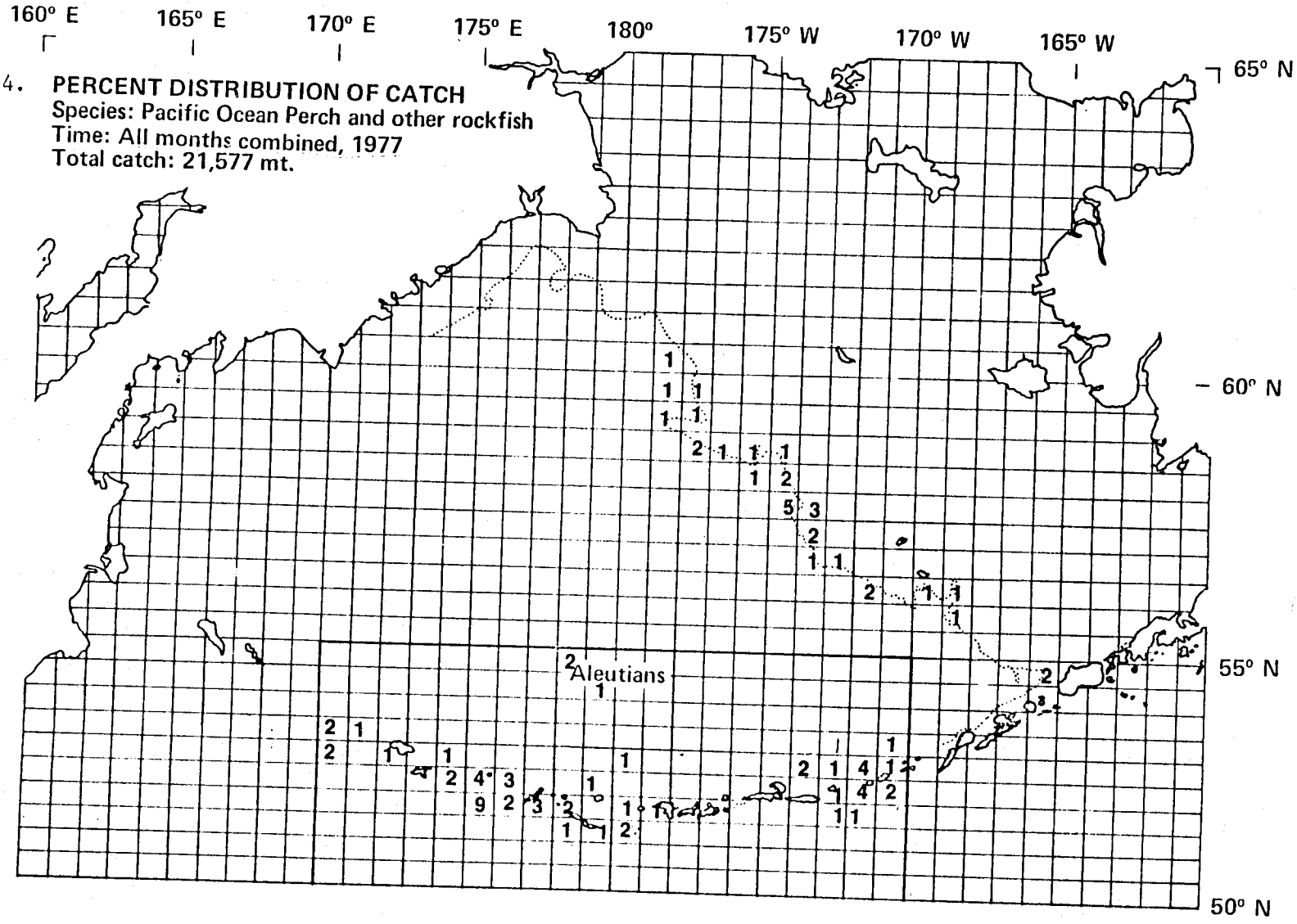


Figure 25. PERCENT DISTRIBUTION OF CATCH
Species: Atka Mackeral
Time: All months combined, 1977
Total catch: 21,764 mt.

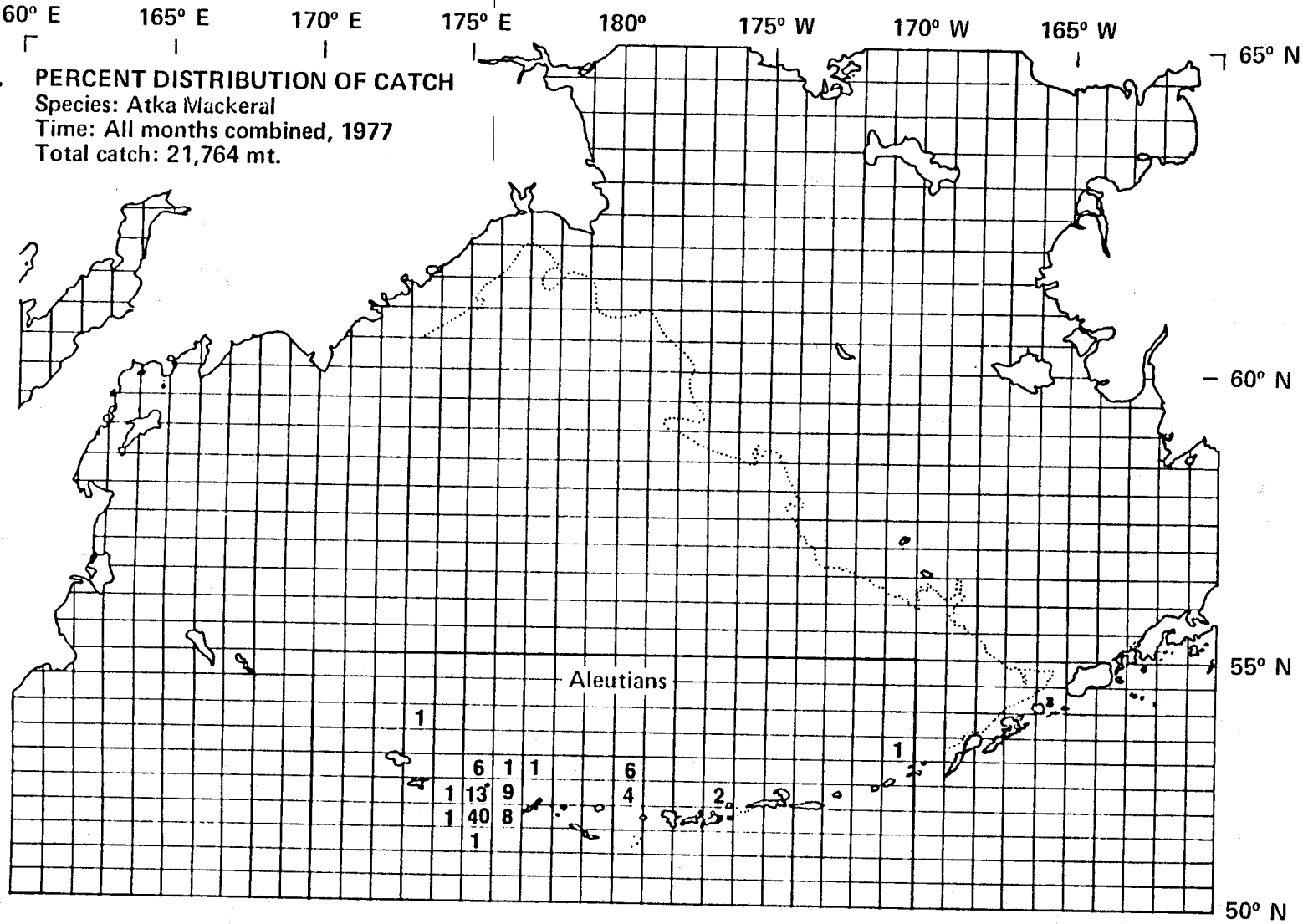


Table 11. Distribution of foreign groundfish catch inside and outside proposed 20 mile closure, 1977.

Species	Is TALFF Available?	Amount of TALFF	% Distribution Within 20-miles of Aleutians	Can TALFF be taken outside 20-miles
All groundfish combined	Yes	929,458	2	Yes
Pollock	Yes	669,230	<1	Yes
Pacific cod	Yes	37,000	3	Yes
Yellowfin sole	Yes	108,895	0	Yes
Turbots	Yes	30,700	8	Yes
Other flatfish	Yes	41,365	<1	Yes
Sablefish	No	400 I.C. 1/	32	Not applicable
Atka mackerel	No	100 I.C.	>50	Not applicable
POP	No	380 I.C.	33	Not applicable
Other rockfish	Yes	3,845	33	Partially

1/ I.C. means incidental catch only, no directed fishing allowed.

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Table 12

1983 Foreign Catches and Exvessel Value
of Fully Utilized Species in Area IV
Within 20 Miles of the Aleutian Chain

FULLY UTILIZED SPECIES	MT. HARVESTED WITHIN 20-MILE CLOSURE AREA	OBSERVER COVERAGE INDICATION OF % OF CATCH INSIDE 20-MILE IS OF TOTAL AREA IV CATCHES	EXVESSEL PRICE AND TOTAL VALUE
Sablefish	44	88%	25¢/lb $24,200
Rockfish (including POP) 33%	1,099	92%	13¢/lb (POP) $314,314
Atka Mackeral	1,097	66%	$154/mt $168,938
TOTAL			$507,452

access to either the Aleutian Islands area or even the entire Bering Sea/Aleutian Islands management area.

Under Alternative 3 there would be no directed TALFFs for any species except pollock. This would in effect expand the 20-mile closure (Alternative 1) and include all foreign vessels rather than just trawl vessels. Only directed pollock fishing would be allowed. Bycatch allowances would be available (as TALFF) for those species not fully utilized by U.S. fishermen. Zero TALFFs for other species would mean those species are prohibited and they could not be retained. However, unless Prohibited Species Catch (PSC) limits were established, the total catch would be unrestricted. Catch of these other species (both prohibited and bycatch TALFF species) would be low because directed pollock fisheries generally have low bycatch rates.

This alternative would completely deny access by foreign nations to the Aleutian rockfish resources, which are not yet fully utilized by U.S. fishermen. No foreign longline fishing for Pacific cod would be allowed, although the longline fleet could probably achieve its TALFF outside Area IV. Achievement of turbot quotas outside Area IV might also prove difficult or impossible.

This alternative differs from the status quo in that currently TACs (and thus separate TALFFs) in the Aleutians are established only for sablefish, Pacific ocean perch, rockfish and pollock. Under Alternative 3, TACs for all other species except pollock will remain unchanged but TALFFs will be available only outside Area IV. Pollock TAC and TALFF in Area IV will remain available inside Area IV.

Alternative 3 is more restrictive than the other alternatives with respect to foreign nations. The maximum impact on them is elimination of all Area IV catches except pollock. This impact is similar to that foreseen when U.S. harvesting capacity completely replaces foreign fishing, but is a more rapid step towards foreign phase-out than expected.

Impacts on Domestic Groundfish Industry

Harvesting: Table 7 shows foreign catches of fully utilized species in INPFC statistical area IV for 1984. At this time it is not possible to determine what proportion of those catches occurred within the proposed 20-mile closure area. It is possible to separate out 1983 catches within 20 miles. This information appears in column 1 of Table 12.

Column 2 indicates the percent reduction in total incidental catch in area IV that the proposed 20-mile closure would imply. Column 3 shows the value of these species at the U.S. ex-vessel level. The total value of these catches amounts to approximately a half million dollars. This represents a direct loss to American fishermen. If the catches were to continue at that rate, total discounted value over a five-year period would amount to $2,704,454 at a five percent real interest rate. This figure represents the present value of losses to U.S. fishermen over a five-year period of foreign by-catches of fully utilized species. However, as Table 7 indicates, the incidental catches dropped in 1984.

To provide a comparison, we can use 1984 catches for area IV and assume all was caught within the 20-mile closure area. This information appears in Table 13. These data imply that if all area IV catches had occurred within 20 miles, a 68 percent reduction in incidental catches of fully utilized species would have occurred in 1984 over 1983. This clearly indicates a substantial reduction in the magnitude of the bycatch problem. The discounted value of 1984 catches projected over five years is $1,213,243. This figure represents the present value of the losses to U.S. fishermen over a five-year period of foreign bycatch amounts at 1984 levels in all of area IV. The percentage of that loss that would be recouped with a 20-mile closure is unknown at present.

Table 13. 1984 Foreign Catches and Ex-vessel Value of Fully Utilized Species

	FOREIGN CATCH (mt)	EX-VESSEL VALUE
Sablefish	102	$56,100
POP	355	$101,530
Atka Mackerel	35	$5,390
TOTAL		$163,020

Concern has also been expressed that a 20-mile closure would dampen Japanese willingness to participate in joint venture activities with the U.S. The Hokuten Trawlers Association, the foreign fishing group most affected by the proposed closure is not currently involved in joint venture activity nor were they directly involved in the industry-to-industry negotiation except that their allocation comes out of the total 900,000 mt groundfish allocation for both the Gulf of Alaska and the Bering Sea/Aleutians regions specified in the agreement. Although the Hokuten Trawlers Association is a politically strong voice in the Japanese fishing industry, it is difficult to foresee major repercussions in Japanese/U.S. joint venture activity as a result of the 20-mile closure action. The proportion of the Japanese catch taken by trawlers within 20 miles in 1983 was less than 8% of the total Japanese catch in the Bering Sea and Aleutian Islands area, and less than 7% of their catch in Alaskan waters.

United States fishermen could also obtain additional benefits as a result of a closure. American fishermen have expressed concerns that wherever foreign trawling is occurring it is taking place where the highest concentrations of fish are found and scattering the rest, leaving little for other concurrent fishing efforts, thus reducing operating efficiency of U.S. vessels. "Reduced operating efficiency" is defined here, for a fishing vessel, to mean a decrease in the amount of fishing time available or in other terms, an increase in the amount of unproductive, non-fishing time which must of necessity be spent in handling gear, prospecting, running, etc. Increased competition from (and possible gear conflict with) foreign fleets reduces fishing time and requires more prospecting and moving of gear. Excluding foreign effort would, therefore, increase fishing time for the domestic fleet, either as more hours fished per day or as more days fished per season.

A 20-mile closure could encourage expansion of domestic fishing efforts in the area. To date there has been only one joint venture operation (Soviet) within the 20-mile closure area for Atka mackeral which in 1983 fished with a catch of 10,359 mt. Another Korean joint venture for POP is in planning stages.

Because little U.S. fishing takes place, the preemption question is more a potential problem rather than an acutal problem.

Removal of foreign fishing will allow resources to "lie fallow" until U.S. effort moves into the area, making the area potentially more economically productive when U.S. exploratory operations begin. Thus, the expected effect would be to increase marginal catch rates for this domestic fishing effort. This increase would be transitory, since higher catch rates will encourage additional U.S. trawl effort to move in.

A detailed analysis of these benefits is carried out in the RIR for Amendment #6 (NPFMC 1982) on the establishment of a U.S. fishery development zone (FDZ). The FDZ is east of the proposed closure but the analysis is quite applicable. It provided a quantitative measure of how a given improvement in operating efficiency (from reduced crowding) will benefit American fishermen. It was not possible to estimate how much operating efficiency would improve with a reduction in foreign effort. Thus, it was not possible to provide a quantitative measure of that source of benefits.

One aspect of a 20 mile closure which may be beneficial to American interests is the encouragement to the lending industry which creation of "American-only" areas seem to provide. It was discovered during Council consideration of the Fisheries Development Zone (Amendment 6 to the FMP) that considerable support for the measure existed in the banking community. Access to future raw product supply is a concern to lenders for expensive groundfish conversions or new construction, and lenders felt that actions such as the FDZ or, in this case, a 20 mile closure, do help provide a beneficial environment for lending in groundfish.

Alternatives 1 and 2 involve foreign incidental catch at some level, and less than maximum access to fully utilized species is provided to domestic industry. However, if the Council chose to eliminate or greatly reduce bycatch TALFFs under these alternatives, nearly maximum access could be provided to the domestic industry.

Alternative 3 is the most straightforward means of achieving elimination of foreign bycatches of fully utilized domestic species. Under this alternative all, or very nearly all, of these resources could be utilized by U.S. fishermen. Other impacts would be similar to those described for Alternative 1.

Due to the severe weather conditions and geographic remoteness of the Aleutian Islands area, only large vessels will be involved in the foreseeable future. Vessels fishing in that area are equipped to stay at sea from four to six weeks on average. Consequently, none of the proposed alternatives including the status quo has distributional implications for small vs. large operations as is referred to in the RFA.

Processing: At the present time almost all domestic fishing activity in the Aleutian Island area is in connection with joint ventures. Table 3 indicates the small fully domestic activity in that area. The secondary benefits to processing of improved operating efficiency and productivity of effort accruing to harvesting as a result of the closure are difficult to quantify at present. There are no apparent demonstrable benefits to the processing sector

from implementation of Alternatives 1, 2 or 3 aside from a general encouragement of domestic development. The existing low DAP catch levels may be construed as the cost of the foreign fishing presence in the area.

Consumer: None of the alternatives should affect retail prices for consumers under any of the alternatives. Bering Sea groundfish catches represent only about three percent of the world catch each year and all of the catch within the 20-mile closure area is currently destined for foreign markets whether totally foreign or joint venture in harvest origin.

Management and Enforcement Impacts

If Alternative 1 is implemented, all foreign trawling within 20 miles of the Aleutian Islands would cease. Foreign fees lost by adoption of this alternative would depend on whether comparable concentrations of flatfish, pollock and rockfish are available to foreign trawlers outside the closure area. Indications are that comparable concentrations do exist in other areas in the Bering Sea/Aleutians vicinity and that foreign fees would not decline due to lack of availability of fish. However, foreign fees are declining as U.S. harvesting replaces foreign harvesting. The enforcement division of the NMFS sees no significant increase in enforcement costs with a 20-mile closure. The area could be monitored by existing surveillance operations. Enforcement costs, given that observer coverage is likely to remain near 100%, would not increase significantly with bycatch quotas. Without 100 percent observer coverage, however, compliance could not be guaranteed and a 20-mile closure would probably be a safer alternative. Alternative 3 would also eliminate foreign fishing (including longlining) within 20 miles of the Aleutians and would eliminate almost all foreign fishing in the entire Area IV. Foreign fees would be reduced just as they would of U.S. harvesting were immediately replacing foreign harvesting. Foreign fees for those species not fully utilized by the U.S. would be lost if adequate concentrations are not available outside Area IV. This is particularly the case for turbots. Other enforcement and management impacts would be similar to Alternative 1.

D. SUMMARY

The 20 mile closure has a potential for reducing foreign incidental bycatch of fully utilized species but may not be completely successful in that regard. Other potential benefits are the reduction of potential grounds preemption and improvement future U. S. catch rates (however temporal) which result from a period of no fishing in the area. Given the greatly reduced foreign catches of the species of concern in the Aleutians in 1984, it is apparent that potential additional reductions of foreign bycatches are relatively small. On the other hand, the potential loss of joint venture relationships which might result from foreign retaliation is tremendous. If the likelihood of such retaliation is small then the benefits to the U. S. outweigh the costs to the U. S.

Bycatch quotas (TALFFs) can be adjusted under the status quo and could theoretically eliminate all foreign bycatches. A possible side effect would be elimination foreign fishing.

Establishing zero TALFFs for all species except pollock is similar to the most stringent status quo, but also addresses other species. The primary

difference between this and Alternative 1 (other than degree of reduction) is that foreign longlining would also be affected. This alternative appears to be the most likely to achieve the goal of elimination of all bycatch of fully utilized U.S. species but also the most impact on foreign fishing patterns and levels.

VI. RULE 4: Establish a reporting system for catcher/processor vessels.

The objective of this proposal is to ensure that fishery managers receive timely estimates of catch by all domestic vessels so that fishery closure notices can be promptly issued when OYs are achieved. With the rapid recent growth of the domestic fishing fleet, increasing importance is being placed on timely reporting of domestic harvests in order to ensure that OYs are not exceeded. Vessels which deliver their catch to shore-based processors land their catch frequently enough to allow timely estimation of total catch under existing regulations. However, vessels which process their catch at sea can remain on the fishing grounds for extended periods of time. Catch reports submitted by these vessels at the time of landing as required under existing regulations are not timely enough to prevent OYs from being grossly exceeded. The resulting overharvests could seriously damage future production from groundfish stocks.

Current fishing regulations implementing the Gulf of Alaska and Bering Sea Fishery Management Plans require fishing vessels to submit a State of Alaska fish ticket or equivalent document to the Alaska Department of Fish and Game for any commercial groundfish harvest in the Gulf of Alaska or Bering Sea within 7 days of the date of landing the catch. Vessels which preserve their catch by non-freezing refrigeration or icing methods must land their catch within a maximum of 10-12 days from the time of harvest in order to ensure product quality. The catch from these vessels, when delivered to shore-based processors, can be reported on a timely basis under existing regulations. If existing regulations are properly enforced, fishery managers can estimate harvests by these vessels with sufficient precision to ensure that OYs are not exceeded.

However, vessels which freeze or salt their catch aboard frequently remain at sea for trips of up to several months duration and are not currently required to report their catch until the time of landing and offloading. At least twenty two catcher/processor vessels will be operating in the Gulf of Alaska and Bering Sea areas in 1985. Based on past catcher/processor landing records the combined hold capacity of these vessels will be approximately 13,000 mt. Therefore these vessels are capable of harvesting significant portions or even entire OYs in a single trip. Under existing fishing regulations, fishery managers have no knowledge of the catch aboard these vessels until the time of landing. In addition, vessels are not required to notify fishery managers when beginning fishing operations. Since domestic groundfish fishing vessels are also not marked for identification by enforcement overflights, the number of catcher/processor vessels actually fishing in a given management area is not known until the time of landing. Without knowledge of effort levels, fishery managers are not able to make projections of catch aboard based on past performance.

Delayed catch reporting is also a problem for fully domestic mothership operations. In these operations small catcher vessels without processing

capability deliver their catch, usually by cod-end transfers, to a mothership/processor vessel. Current regulations require that an ADF&G fish ticket be filled out each time a catcher vessel delivers to the mothership/processor and that these fish tickets be forwarded to ADF&G within 7 days of the date that fish were delivered. Domestic mothership and floating processor operations thus far have all occurred in sheltered waters with at least periodic access to U.S. mail service so that regulations requiring filing of fish tickets with ADF&G within 7 days could have been enforced. However, there is a potential for these mothership operations to occur at sea, with no method of filing the fish tickets with ADF&G within the 7 day period required by law.

With such large processing capacities and increasing numbers of catcher/processor and mothership/processor vessels, the risks of overharvesting groundfish resources under the current system are high. Because of the time delays involved in catch reporting under current regulations, groundfish resources could be drastically overharvested before fishery managers had even discovered that OYs had been exceeded. Since many of the groundfish species concerned are slow growing and long-lived, overharvesting can have considerable impacts on future production.

A. (Alternative 1) Maintain the status quo system with catches reported on ADF&G fish tickets at the time of landing.

Because catch reports are not required until the time of landing under the current regulatory regime, OYs will almost always be exceeded before a fishery closure order can be issued. Given the large hold capacity of the current catcher/processor and mothership/processor fleets and the rapid expansion of these fleets, the risks of overfishing and reducing stock production in future years is high. Under the current regulations, fishery managers have no knowledge of fishing effort by area prior to the time of landing by each vessel and are therefore not able to project catches based on past performance.

Under this alternative, as well as under all alternatives which do not require onboard observers, discarded prohibited species catches will remain largely unaccounted for. Prohibited species caught and discarded at sea usually have high mortality rates, especially for trawl gear catches. Prohibited species catches as well as discard mortality of unwanted species is largely unaccounted for under the present system. In certain few cases, prohibited species catches can be extrapolated from data provided from the limited observer program of ADF&G or from the NMFS foreign and joint venture observer program. Prohibited species catches can easily be illegally retained, landed and sold by catcher/processors under the current regulatory and enforcement system.

Enforcement of regulations prohibiting catches of species after fishery closure orders have been issued is extremely difficult under the present system. Because there is no existing method of tracking or even identifying catcher/processor vessels on the fishing grounds, it is difficult to locate, board and inspect the holds of these vessels on the fishing grounds or in port during the infrequent landings of these vessels. Because of the duration of fishing trips by catcher/processor vessels, these vessels retain large quantities of legally caught catches in their holds long after fisheries for

certain species have been closed but prior to their subsequent landing and offloading. Enforcement of fishery closure regulations by hold inspections is extremely difficult under these conditions.

The reporting burdens placed on fishing vessels under the current regulations are minimal. Vessels are required to fill out an ADF&G fish ticket or provide equivalent information within 7 days of the date of landing or delivering their catch. ADF&G fish tickets require vessels to identify the vessel, operator, processor, gear(s) used, and catch by species in each ADF&G statistical area fished for the duration of the trip. Catches are not required to be subdivided into time units smaller than the duration of the trip. Vessels which are leaving Alaskan waters to deliver to ports outside the state of Alaska are required to notify ADF&G or NMFS of their departure prior to leaving the FCZ. Very few vessels have abided by this regulation in the past. The regulation is very difficult to enforce without prior knowledge of which vessels are capable of delivering catches outside of the state of Alaska.

B. (Alternative 2) Require FCZ processing permit with check-in/check-out and weekly catch report.

Under this alternative vessels would be required to obtain a permit to process their catch in the FCZ. The permit would serve to identify those vessels which would be required to participate in the additional reporting programs. Each time one of these vessels enters or leaves an FMP management area (an area for which a quota is defined), they would be required to notify NMFS via U.S. Coast Guard radio. These vessels would also be required to submit a report to NMFS by Coast Guard radio, U.S. mail, or telex for each fishing week documenting the hail weight estimates of catch by FMP species group in each FMP area. These weekly reports would be due within 7 days of the end of the fishing week. The medium by which the catch reports are submitted is up to the discretion of the vessel operator. Large catcher/processor and mothership/processor operations usually maintain home port offices which are in at least weekly contact with their vessels. Catch reports could be submitted by these offices via telex, telephone, or U.S. mail. Smaller operations without frequent home office contact would have to contact NMFS via U.S. Coast Guard radio.

Under this alternative, as well as under all alternatives which do not require onboard observers, discarded prohibited species catches will remain largely unaccounted. Prohibited species caught and discarded at sea usually have high mortality rates, especially for trawl gear catches. Prohibited species catches as well as discard mortality of unwanted species is largely unaccounted for under the present system. In certain few cases, prohibited species catches can be extrapolated from data provided from the limited observer program of ADF&G or from the NMFS foreign and joint venture observer program. Prohibited species catches can easily be illegally retained, landed and sold by catcher/processors under the current regulatory and enforcement system.

Under this alternative, fishery managers would be provided with estimates of catch aboard from FCZ domestic processing vessels that were no more than two weeks old. With the check-in/check-out reporting requirement, projections of catch within the most recent two week period could be made based on past performance. This method would allow fishery managers to estimate the date when OYs would be achieved with a moderate level of precision.

With the check-in/check-out reporting requirement, catch reporting by area fished can be enforced. The locations of vessels boarded at sea or sighted from enforcement overflights could be checked against the check- in/check-out list for verification. Without the check-in/check-out requirement, vessels could easily alter the reported area of fishing on the weekly catch report in the rare event of an enforcement boarding or overflight observation. The check-in/check-out requirement would also enable enforcement officials to be notified of upcoming landings so that hold inspections could be performed at the port of landing. Hold inspections performed at the port of landing impose far less burden on fishing vessels than at-sea boardings and are much less expensive to implement. Weekly catch reports would be verified against ADF&G fish tickets which would be submitted at the time of landing. Spot checking of catches from hold inspections performed at the port of landing could be used to verify the fish ticket information.

The catch data in the weekly catch reports would be based on skipper's estimates of catch weights or "hail weights" by species group and management area. Fishing vessels do not weigh their catch at sea and can only estimate "hail weights" from experience. At the time vessels offload their catch, more accurate weights are obtained and these are recorded on the fish ticket, presently required under state and federal regulations, which is forwarded to ADF&G. It is always desirable to update the "soft" data obtained from "hail weights" with the more accurate weights and specific statistical areas obtained from fish tickets.

C. (Alternative 3) Require an FCZ processing permit with a weekly catch report, but without check-in/out.

Under this alternative vessels would be required to obtain a permit to process their catch in the FCZ. The permit would serve to identify those vessels which would be required to participate in the weekly catch reporting programs. These vessels would then be required to submit a report to NMFS by Coast Guard radio, U.S. mail, or telex for each fishing week documenting the hail weight estimates of catch by FMP species group in each FMP area. These weekly reports would be due within 7 days of the end of the fishing week. The medium by which the catch reports are submitted is up to the discretion of the vessel operator. Large catcher/processor and mothership/processor operations usually maintain home port offices which are in at least weekly contact with their vessels. Catch reports could be submitted by these offices via telex, telephone, or U.S. mail. Smaller operations without frequent home office contact would have to contact NMFS via U.S. Coast Guard radio.

Under Alternative 3, as well as under all alternatives which do not require onboard observers, discarded prohibited species catches will remain largely unaccounted for. Prohibited species caught and discarded at sea usually have high mortality rates, especially for trawl gear catches. Prohibited species catches as well as discard mortality of unwanted species is largely unaccounted for under the present system. In certain few cases, prohibited species catches can be extrapolated from data provided from the limited observer program of ADF&G or from the NMFS foreign and joint venture observer program. Prohibited species catches can easily be illegally retained, landed and sold by catcher/processors under the current regulatory and enforcement system.

Under this alternative, fishery managers would be provided with estimates of catch aboard from FCZ domestic processing vessels that were no more than two weeks old. Fishery managers would make projections of current catch based on past performance and the two week old effort distribution provided in the weekly catch reports.

Without the check-in/check-out reporting requirement, catch reporting by area is more difficult to enforce. The locations of vessels boarded at sea or sighted from enforcement overflights could only be checked against areas fished that are reported at the end of each week. Vessels could easily alter the reported area of fishing on the weekly catch report in the rare event of an enforcement boarding or overflight observation. The current FCZ checkout regulation could enable enforcement officials to be notified of upcoming out-of-state landings so that hold inspections could be performed at the port of landing. However, lacking knowledge of the vessels which are actually operating in an area, the current check-out regulation has been difficult to enforce. Hold inspections performed at the port of landing impose far less burden on fishing vessels than at-sea boardings and are much less expensive to implement. Weekly catch reports would be verified against ADF&G fish tickets which would be submitted at the time of landing. Spot checking of catches from hold inspections performed at the port of landing could be used to verify the fish ticket information.

The catch data in the weekly catch reports would be based on skipper's estimates of catch weights or "hail weights" by species group and management area. Fishing vessels do not weigh their catch at sea and can only estimate "hail weights" from experience. At the time vessels offload their catch, more accurate weights are obtained and these are recorded on the fish ticket, presently required under state and federal regulations, which is forwarded to ADF&G. It is always desirable to update the "soft" data obtained from "hail weights" with the more accurate weights and specific statistical areas obtained from fish tickets.

D. (Alternative 4) Place observers aboard a small sample of catcher/processor vessels and mothership/processors and extrapolate the catch from these vessels to the entire fleet.

Under this alternative vessels would be required to obtain a permit to process their catch in the FCZ. The conditions of the permit would require observers to be allowed onboard, if requested. All processing vessels would be required to notify NMFS via U.S. Coast Guard radio each time they entered or left an FMP management area. Observers would be placed aboard a sample of catcher/processors and mothership/processors. Observers would radio catch reports to fishery managers on a weekly basis. The observed catch sample would be extrapolated to the total catch in an FMP management area based on the ratio of sampled effort to total effort as determined from the vessel check-in/check-out system.

Observer derived samples provide the most accurate estimates of total catch of the alternatives. Observer samples estimate catch of all species, including prohibited species and unwanted legal species or sizes that are discarded. Observer samples would also provide the least time delay in catch reporting of the alternatives, at a maximum lag of one week. However, observer derived catch sampling is by far the most expensive of the alternatives. Based on the

performance of the foreign and joint venture observer programs, observers would have to be placed aboard at least 30% of the vessels in the fleet in order to provide catch estimates with sufficient precision. Reporting burdens place on vessel operators are reduced under this alternative since no in-season catch reporting is required of the vessel operator. Vessel operators would still have to notify NMFS each time they entered or left an FMP area. Because of cramped living conditions aboard most domestic fishing vessels, vessel operators would be burdened to some extent by the presence of the observer aboard, even if reimbursed for the living expenses of the observer.

E. (Alternative 5) Place observers aboard all catcher/processor and mothership/processor vessels.

Under this alternative vessels would be required to obtain a permit to process their catch in the FCZ. The conditions of the permit would require an observer to be taken aboard at all times. Observers would radio catch reports to fishery managers on a weekly basis. Catches within areas could be computed by fishery managers as total counts.

Observer derived samples provide the most accurate estimates of total catch of the alternatives. Observer samples estimate catch of all species, including prohibited species and unwanted legal species or sizes that are discarded. Observer samples also provide the least delay in catch reporting of the alternatives, at a maximum lag of one week. Placing observers aboard all catcher/processor and mothership vessels could be prohibitively expensive. Reporting burdens placed on vessel operators are minimal under this alternative since no in-season reporting is required of the vessel operator. Vessels would not be required to check in or out of FMP areas since the observer reports would contain this information for all vessels. Because of cramped living conditions aboard most domestic fishing vessels, vessel operators would be burdened to some extent by the presence of the observer aboard, even if reimbursed for the living expenses of the observer.

VII. RULE 5: Implement the NMFS Habitat Policy

The proposed action amends the FMP by modifying and adding certain sections specifically to address the habitat requirements of individual species in the Bering Sea/Aleutian Islands groundfish fishery. The amendment describes the diverse habitat types within the Bering Sea and Aleutian Islands, delineates the life states of the species, identifies potential sources of habitat degradation and the potential risk to the fishery, and describes existing programs, applicable to the area, that are designed to protect, maintain, or restore the habitat of living marine resources. The amendment is not mandated by law but rather responds to the Habitat Conservation Policy of the National Marine Fisheries Service, which advocates emphatic consideration of habitat concerns in the development or amendment of FMPs, and the strengthening of NMFS' partnerships with states and the Councils on habitat issues. It also provides the necessary authorization for institution of marine debris restrictions and other regulations to protect the marine habitat.

A. (Alternative 1 = proposed). Amend the FMP to address habitat considerations, based on the best available information, to meet standards set forth in the National Marine Fisheries Service's Habitat Conservation Policy.

This alternative focuses, within the FMP, on habitat as the source of productivity of a fishery and demonstrates Council awareness of potential adverse and cumulative effects of man-induced habitat alterations on the health of stocks and size of the harvest. It would provide legal foundation for future Council expressions of concern and action should the need arise, and would provide the Secretary with a basis for implementing appropriate Council habitat recommendations to the extent possible within legal and budget limitations.

B. (Alternative 2 = proposed). Amend the FMP to add a general habitat conservation objective. However, the more detailed material that is under the Alternative 1 proposed amendment would be included in a separate Council Habitat Document that would be referenced in, but not part of, the FMP.

This alternative would issue the amendment text as a Council Habitat Document separate from, but referenced in the FMP. Not subject to Secretarial approval, it would provide essentially the same information without the need for FMP amendment should the information change. Whether future Council action based on information published separately from the FMP would have the same legal effect is uncertain and is being evaluated.

C. (Alternative 3 = status quo). Do not amend the FMP to address habitat considerations.

Under this alternative, the FMP would not be responsive to the NMFS Habitat Conservation Policy.

VIII. LITERATURE CITED

Narita, Reynold E., J.M. Wall and R.E. Nelson. Summary Data on Incidental Catch of Salmon by Foreign and Joint Venture Groundfish Fisheries in the Bering Sea, 1977-1984. NMFS/NWAFC, February 1985. Unpublished manuscript, 35 pp.

NPFMC 1982. Reducing the Incidental Catch of Prohibited Species by Foreign Groundfish Fisheries in the Bering Sea (Council Document #13), 195 pp.

IX. LIST OF PREPARERS

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F/M1:PHF

14 May, 1985

TO: F/M11-- William P. Jensen

FROM: F/M1 - Peter H. Fricke

SUBJECT: Draft amendment 9 to the Bering Sea/Aleutian Islands Groundfish FMP

As requested I have reviewed the above draft amendment.

With regard to the proposal (rule 1) to increase the OY for the area, I can foreseemno social impacts which will not be beneficial.

With regard to the proposal (rule 2) for a closed season to avoid the incidental take of chum salmon, it would appear that the preferred alternative of a closed season is the simplest to implement and would have the least social impacts.for the joint-venture systems relative to the other alternatives, and would minimize impacts on the domestic salmon fishermen. I agree with the RIR analysis on this point.

The third proposal (rule 3) for a prohibition of foreign fishing (in part or all) within 20 miles of the Aleutian Islands, cannot easily be assessed for social impacts given the information provided, and I cannot comment on this time, other than to note that a closed area is easier to enforce and would be consistent with NMFS efforts to encourage domestic fishing.

The proposal for catch reporting by catcher/processor vessels will have limited social impacts -- affecting only the vessels involved and others who rely on the data provided -- and alternative two, as proposed, would appear to be the most effective.

Implementation of the NMFS habitat policy (rule 5) will have minimum social impacts on fishermen per se, based on the information provided, but will provide additional information for the "ecological leg" of the optimum yield modification tripod of ecological, economic and sociological factors. As such, it could be very useful.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Washington, D.C. 20235

APR 17 1985

F/M11:RBG

TO: Distribution*

FROM: FM11 - William P. Jensen

SUBJECT: Draft Amendment 9 to the Bering Sea/Aleutian Islands Groundfish Fishery Management Plan (FMP)

Attached is a Notice of Availability of the subject amendment together with related documents. We ask that you review and comment on the summary of Amendment 9 and related draft Environmental Assessment, draft Regulatory Impact Review/Initial Regulatory Flexibility Analysis, and draft Habitat Sections (to be included in the FMP). Despite the absence of a draft amendment, per se, and an S.F. 83-1 and draft proposed regulations, this memo initates the Washington Office Portion of Phase III review under the Operational Guidelines. Phase III is scheduled to end on May 3 and we need your comments by April 26 in order to provide timely comments to the NMFS Alaska Regional Office. The North Pacific Fishery Management Council will be considering Amendment 9 for formal adoption at its May 21-24, 1985 meeting.

Your expedited comments on this amendment package would be appreciated. If you have any questions, please contact Robert Gorrell at 634-7449.

*Distrubution:

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